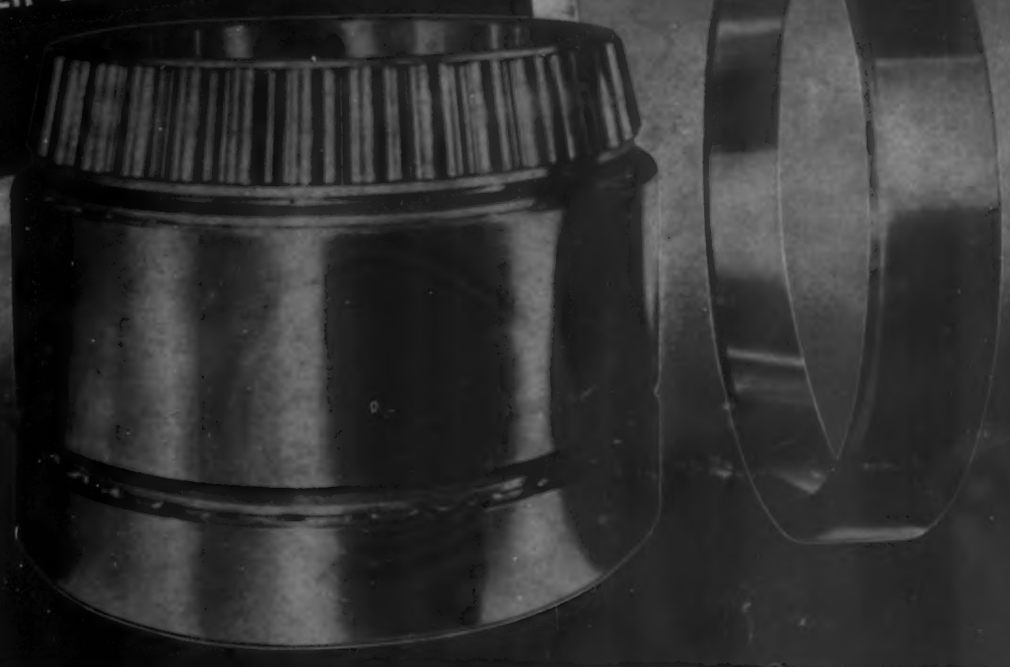
June 14, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

30% GREATER ACTUAL CAPACITY THAN ANY OTHER TAPERED ROLLER BEARING EVER BUILT!



To hasten the day of Victory and help to meet the competitive challenge of the years that follow, equip your rolling mills and other equipment with Timken Tapered Roller Bearings wherever possible.

Above is pictured one of the Timken Back-up Roll Neck Bearings installed in the 4-high reversing hot mill of the Aluminum Company of America at Alcoa, Tenn.

These bearings have been in operation about 17 months and, on the basis of the service given by so many other Timken Roll Neck Bearings, still will be going strong, keeping up production and holding down costs, many years from now.

They have a bore of 35½", an outside diameter of 51" and a width of 36"; weigh 9,070 lbs. apiece; and have a mill separating force capacity of 8,300,000 pounds at mill speed. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

Feather-touch Control

OF EC&M MASTER SWITCH MINIMIZES FATIGUE *aids* PRODUCTION

OPERATORS like the *exceptionally smooth* operation of this EC&M Master Switch (Type NT). It lessens fatigue—an even greater consideration today than ever before, with more and more women entering industry.

Furthermore, this switch, in combination with magnetic contactor control, produces a *quick response* in motor-driven machines. It gives *more accurate control* of machines and helps a lot in those inching operations.

An important feature, too, is its narrow width allowing several of these EC&M Master Switches to be lined up side by side—*and all easy to reach!*

Bulletin 1182-1 completely describes this Master Switch for use with EC&M Bulletin 921 Crane Control or Bulletin 925 Mill Auxiliary Control. Write for your copies to-day.

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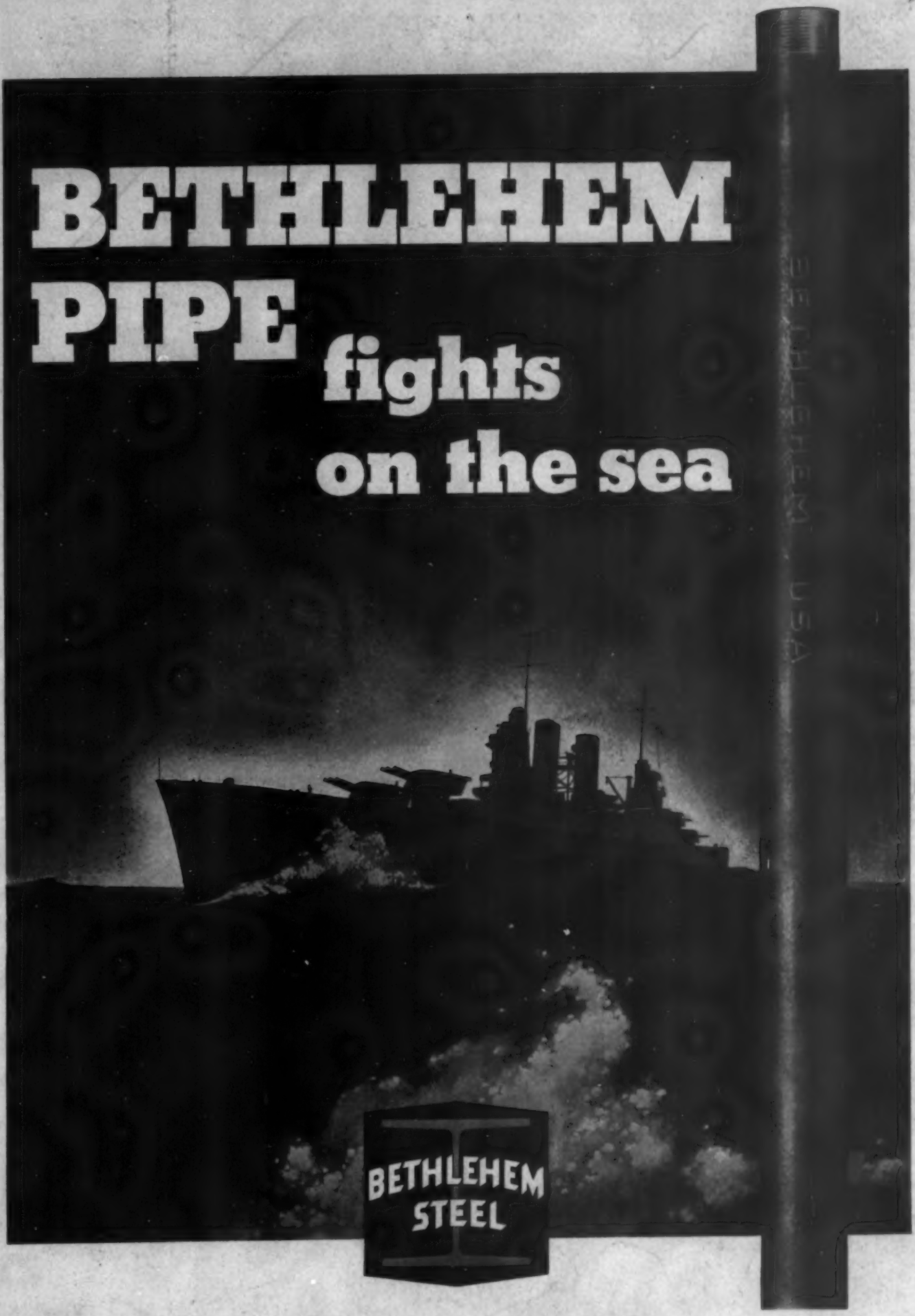
BETHLEHEM PIPE fights on the sea



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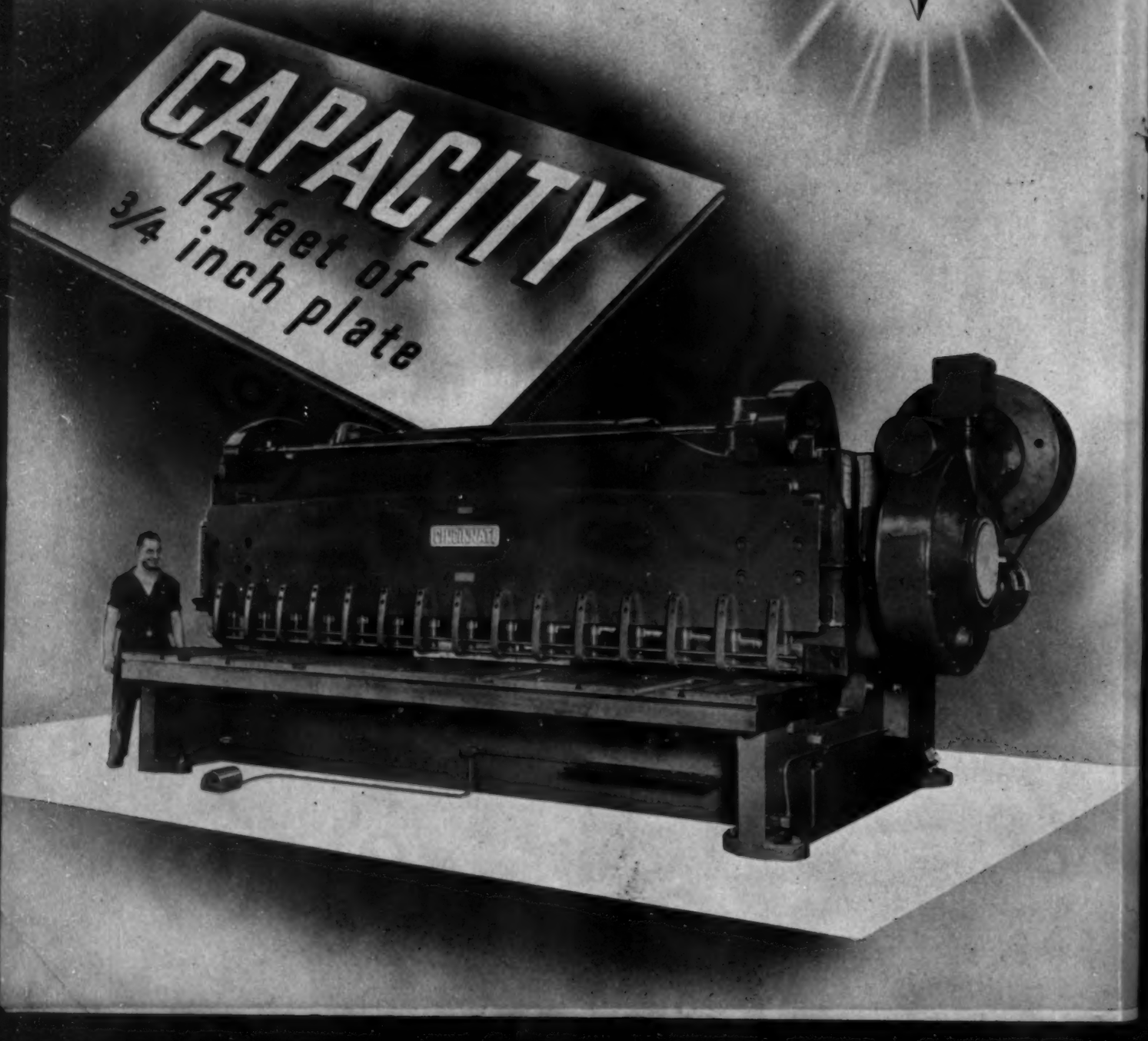
This ¾" by 14-ft. Shear is typical of the Cincinnati line with capacities of 1¼" in thickness, 18-ft. in length, and capable of handling the toughest of materials . . . armor plate. These powerful Cincinnati All-Steel Shears . . . built like a machine tool and equipped with exclusive Cincinnati hydraulic holddowns . . . shear with micrometer accuracy.

Write for informative book S-3 on the complete line of Cincinnati Shapers.



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1 Compact self-contained flexible drive

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The McKAY MACHINE Company

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SOLD BY THE WEAN ENGINEERING CO., INC., WARREN, OHIO

BEHIND THE SCENES

Advice to the Victory Gardener

■ "Rain, rain—go away" has become the theme song of every metalworking victory gardener in this, the Cleveland area, at least. And from what little information seeps through the wartime weather bureau censorship we're not alone in our plaintive chant. But whether you are an old and experienced gardener who already is bragging about the peas you had last night for dinner or one of the rank amateurs like ourselves we believe you'll get some real help and advice from Doctor Horatio K. Bunbottom's Garden Column which we are snitching from the May issue of the American Foundry Equipment Co.'s *Parade*. It follows:

Selecting the Site

■ "The first step in establishing a garden is the selection of the site. This, preferably, should be just beyond the reach of your sprinkling hose, as it is considered quite fashionable to use buckets to carry water out to your dying plants. Besides that, the water slopping down your pants' leg has a definite cooling effect which will be much appreciated on hot summer days.

"Once the site has been determined, a simple soil test should be made. This test consists of picking up a clod of dirt, smelling it, and then crumbling it between your fingers. This will create the impression that you are a soil expert, and it also dirties your shirt front which gives you an honest, down-to-earth appearance.

Acquiring the Tools

■ "Obtaining a full assortment of tools is the next step. This is best done by borrowing from the neighbors; although, under very unusual circumstances, actual purchasing from the local hardware store is permissible. One of the most important of all tools is the hoe, so be sure to get one with a sturdy handle. You will find it of great value in helping to assume the Tired Gardener Stance which will awe both your family and close neighbors.

"The successful gardener also makes judicious use of fertilizer, of which there are two general types—one coming from bags and the other from nags. You will find that a great many people will insist the bag type is just as nutritive as the Old Original, but it is suggested you get the opinion of any well informed sparrow on this.

Preparing the Soil

■ "The soil should next be prepared and the most popular way is to hire some farmer to do the plowing. The farmer and plow method gives him a chance to show his skill in driving horses. When he shouts "Gee", that is the signal for the horses to swing to the right and trample down your wife's begonia bush. "Haw" means just the opposite . . . (The begonia bush tramples down the horses?)

When To Plant

■ "When to plant, probably, will be your biggest problem. Late frosts get the early vegetables and early frosts get the late ones. It is well to remember that certain things should be planted on certain days. Potatoes, for instance, should be in the ground by St. Patrick's Day. Of course, if you aren't going to raise potatoes, it doesn't matter what day you don't plant them on.

. . . And How

■ "The majority of garden vegetables are grown from seed, and there are various ways of planting. One expert advocates wrapping each seed in lead so the weight will cause the seed to sink in the ground and thus plant itself. This method is not generally recommended, for it is one sure-fire way to get lead in your plants.

"Radishes are a very popular item. Why, no one seems to know. They are pictured on the seed packet as being colorful scarlet globes tipped by small green leaves. Actually the average home-grown radish resembles spinach with large green leaves and an edible portion more like a toothpick.

Vitamin Content Important

■ "Tomatoes are also a popular vegetable. They are generally grown from plants purchased from commercial growers. The plants usually seem sickly and puny and don't look as if they will survive. Don't let them fool you—they are, and they won't.

"Vegetables generally are famous for their vitamin content, some having more than others. Parsnips, turnips and spinach are notoriously rich in vitamin content; while the things you like, such as strawberries, and corn-on-the-cob, are sadly lacking. This often tempts the amateur gardener to try developing new species which incorporate the good points of several types. We warn that this does not pay. We knew of one man who, after years of experimentation, succeeded in growing strawberries that tasted like spinach. He wrote the Department of Agriculture and told them but instead of complimenting him they told him it wasn't worth much unless he could develop a spinach that tasted like strawberries. This particular friend gave up the whole idea and put in a miniature golf course instead."

How To Get to Heaven

■ We all know the plight of association secretaries and can therefore appreciate this complaining obit written by the Secretary of the Purchasing Agents Association of Birmingham, Ala., as he retired from office at their last convention:

The Secretary stood at the pearly gate
His face was worn and old.
He merely asked the man at the gate
For admission to the fold.
What did you do down there? St. Peter asked
To gain admission here?
Oh, I used to be a Secretary,
Down there for many a year.
The pearly gate swung wide open sharp
As St. Peter tapped the bell.
Come in, Old Top, and take your harp,
You have had enough of hell!

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Editorial Contents—Page 59

...Any "JAPANESE WRITING" *In Your Shop?*

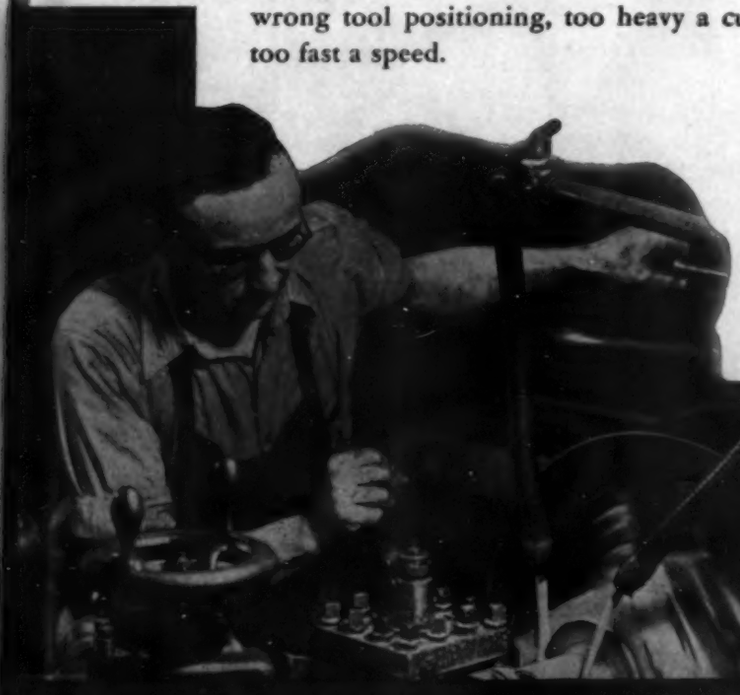
"CHINESE WRITING", shopmen used to call it—a humorous, vivid description of the marks, gouges, and scratches on a work piece, caused by an inaccurate machine, improper tool setting or careless workmanship.

But today "Japanese writing" is the new and more appropriate term for these shop errors because every scrapped piece, or time lost in unnecessary grinding and refinishing operations, hurts America and helps Japan.

A number of things can cause "Japanese writing" in turret lathe turning operations—inaccuracies because of worn parts, improperly ground cutters, incorrect type of tool, wrong tool positioning, too heavy a cut or too fast a speed.

And these factors can be licked—probably very easily. A Warner & Swasey field engineer can help you do it by on-the-spot diagnosis. Also available to turret lathe departments are the Turret Lathe Operator's Manual, Turret Lathe Rebuilding Booklet, Tool Catalog, Bar Turner Booklet, Cutter Grinding Educational Motion Picture, Feed and Speed Calculator—and to your operators, "Blue Chips", a shop bulletin written especially for turret lathe operators that brings valuable, practical information, tips, short-cuts, etc.

If you have trouble with "Japanese writing" or any other work spoilage that slows production from your turret lathes, perhaps we can help—write Warner & Swasey, Cleveland, Ohio.



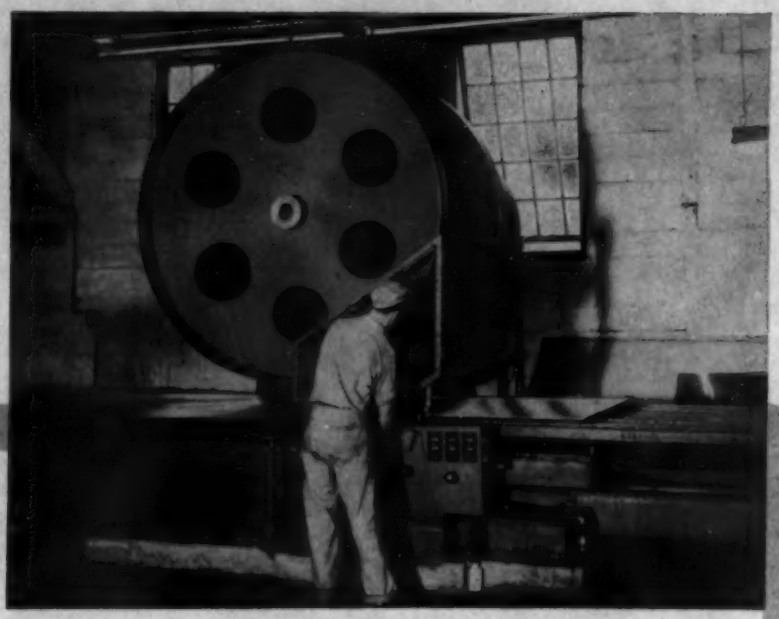
Important New Booklet Now Ready for Distribution—

"Better Performance from Single Cutter Bar Turners"—a 32-page booklet for better understanding and use of a tool that is used more than any other tool for bar work. Write for your copies!

WARNER & SWASEY FOR VICTORY

Consult JESSOP

FOR RECOMMENDATIONS ON YOUR STAINLESS STEEL APPLICATIONS



Polishing Jessop Stainless Steel

Jessop makes corrosion-resisting, heat resisting, and high strength stainless steels in standard analyses for all applications.

In addition to the most popular stainless steels falling into these classifications, there are other types which combine all three characteristics in varying balances. All are produced in electric furnaces under careful regulation of the Jessop Controlled Quality Plan.

Special analyses will be furnished on specific request. Our representatives will be glad to advise you on particular applications. Write for complete information.

TRADE NAME	TYPE	ANALYSIS		
AUSTENITIC STAINLESS STEELS (Cr-Ni)				
Hi-Gloss	302	C-.08/.20%	Cr.-17.50/20.00%	Ni-8.00/10.00%
Hi-Gloss	304	C-.08 max.	Cr.-18.00/20.00%	Ni-8.00/10.00%
Hi-Gloss*	303	C-.20 max.	Cr.-17.50/20.00%	Ni-8.00/10.00 Se..15/.35%
Hi-Gloss-MO	316	C-.10 max.	Cr.-16.00/18.00%	Ni. 10.00/14.00 Mo 2.00/3.00
Hi-Gloss-Cb	347	C-.10 max.	Cr.-17.00/20.00%	Ni. 8.00/12.00 Cb-10xC
CHROMIUM STAINLESS IRONS AND STEELS				
Duro-Gloss C-1	410	C .15% max.	Cr. 10.00/14.00%	
Sta-Gloss—A	420	C .35%	Cr. 12.00/14.00%	
Sta-Gloss—B	440	C .80%	Cr. 14.00/18.00%	
Duro-Gloss*	416	C .15% max.	Cr. 12.00/14.00%	S-.15/.35%
Duro-Gloss	430	C .12 max.	Cr. 14.00/18.00%	

*Free Machining Grade.

ESTABLISHED 1901

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Texaco Cutting Oils, (Sultex, Transultex and Cleartex), lubricate the tools, prevent chip welding and carry away the heat, assuring improved surface finish, and maximum output per tool grind.

So effective have Texaco Lubricants proved that they are definitely preferred in many important fields, a few of which are listed in the panel.

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★More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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RESISTORS ON 24-HOUR WATCH

Electrical equipment aboard ship has no off-duty time. Radio, intercommunication, air conditioning, ventilation, refrigeration, deck machinery, gun operation and innumerable other vital services employ resistors in their control circuits. These resistors must be dependable to function at all times. Ward Leonard Vitrohm Resistors have measured up to their responsibilities. Their ability to withstand moisture, temperature change, shock and vibration makes them particularly well fitted for sea duty. Resistors with the same ruggedness as those used by the Navy and Merchant Marine are available to all industry engaged in victory production. Send for data sheets.

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Electric control (WL) devices since 1892.

WARD LEONARD ELECTRIC COMPANY, 65 SOUTH STREET, MOUNT VERNON, N. Y.

ROEBLING "Blue Center" helps make it an unpleasant one!

GAINING ACCESS to key points from which our boys with bayonets can prod the Axis rear is a fine art our Corps of Engineers is rehearsing well in advance. Some fine day soon that art will go into action where it really counts. And the you-know-whats who started all this will find that the nation that produced a Francis Marion, a Jeb Stuart, a Cump Sherman, is still producing them—with up-to-date trimmings.

One of those trimmings is the sturdy steel pontoon bridge above, designed to be thrown across water "barriers" in a matter of mere hours. Another is the modern rope-rigged equipment our Engineers use for the throwing. With weapons like these and their "we'll try anything" spirit, those Engineers are ready to go to town. And you know *what* town!

Wherever the going is tough today—at training centers, on maneuvers, at the fighting front—Roebling "Blue Center" Steel Wire Rope is pulling its weight for Victory. Pulling with all the knowledge and skill and pride Roebling engineers and Roebling workers have built into every foot of it.

ROEBLING "Blue Center" STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

DON'T LET YOUR ROPES SPRING A SURPRISE ON *YOU!*

YOU CAN FORESTALL it by following a regular inspection and maintenance routine for *all* your ropes. Through such periodic checks, you can stop the *causes* of undue rope wear, keep your ropes on the job for Victory. To make this even easier, Roebling engineers have prepared the handy tag illustrated here, containing a wealth of conservation data to keep your operators and maintenance men reminded of precautions to be observed at all times. Copies of this tag, printed on heavy stock and varnished for easy cleaning, are yours for the asking. Write your nearest Roebling office for your free supply. Ask for Tag "A".

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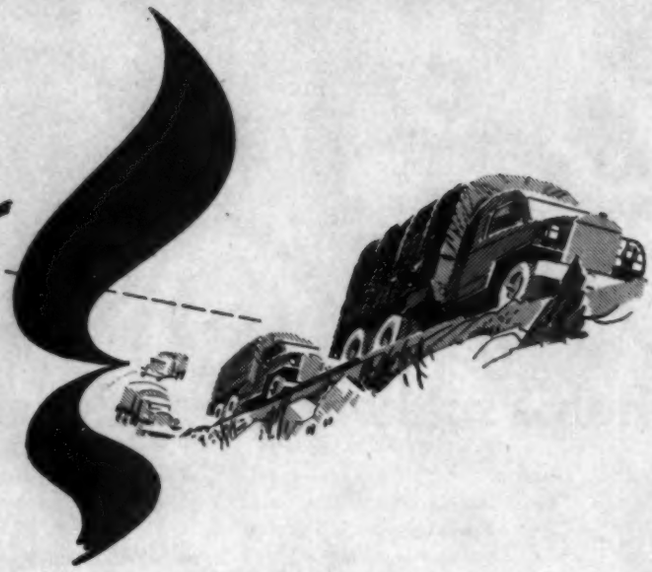
to speed victory



skilled men . . .

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"DOUBLE CONTROL" of quality

At each step in the steel-making process—from iron ore to the last detail of shipping—the combination of control by men and by machines gives "double control" to the quality of Weirton steel . . . steel so vitally needed to build tanks, trucks, ships, shells, guns and all the other tools required by our Armed Forces.

To make possible the "double control" of quality here at Weirton, men of experience—only those especially trained in the art and science of steel-making—are employed. Then, these skilled craftsmen make machines of the very latest designs do their bidding. That's what is meant by Weirton's "double control" of quality.

At Weirton, men and women are bending every effort to see that the Army, the Navy, the Maritime Commission and our regular customers working on War Production get the steel needed to produce Victory equipment.

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Weirton, West Virginia

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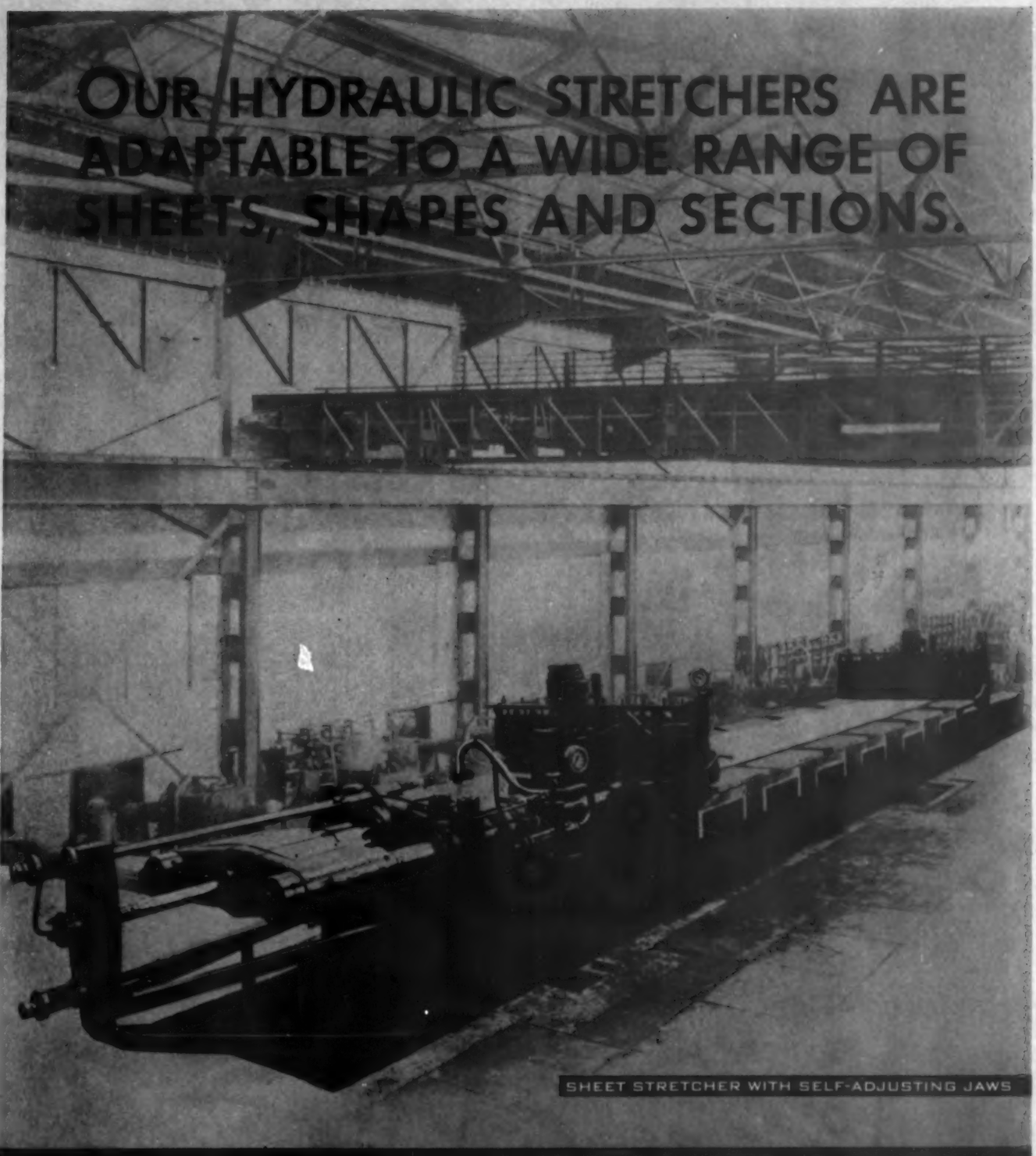

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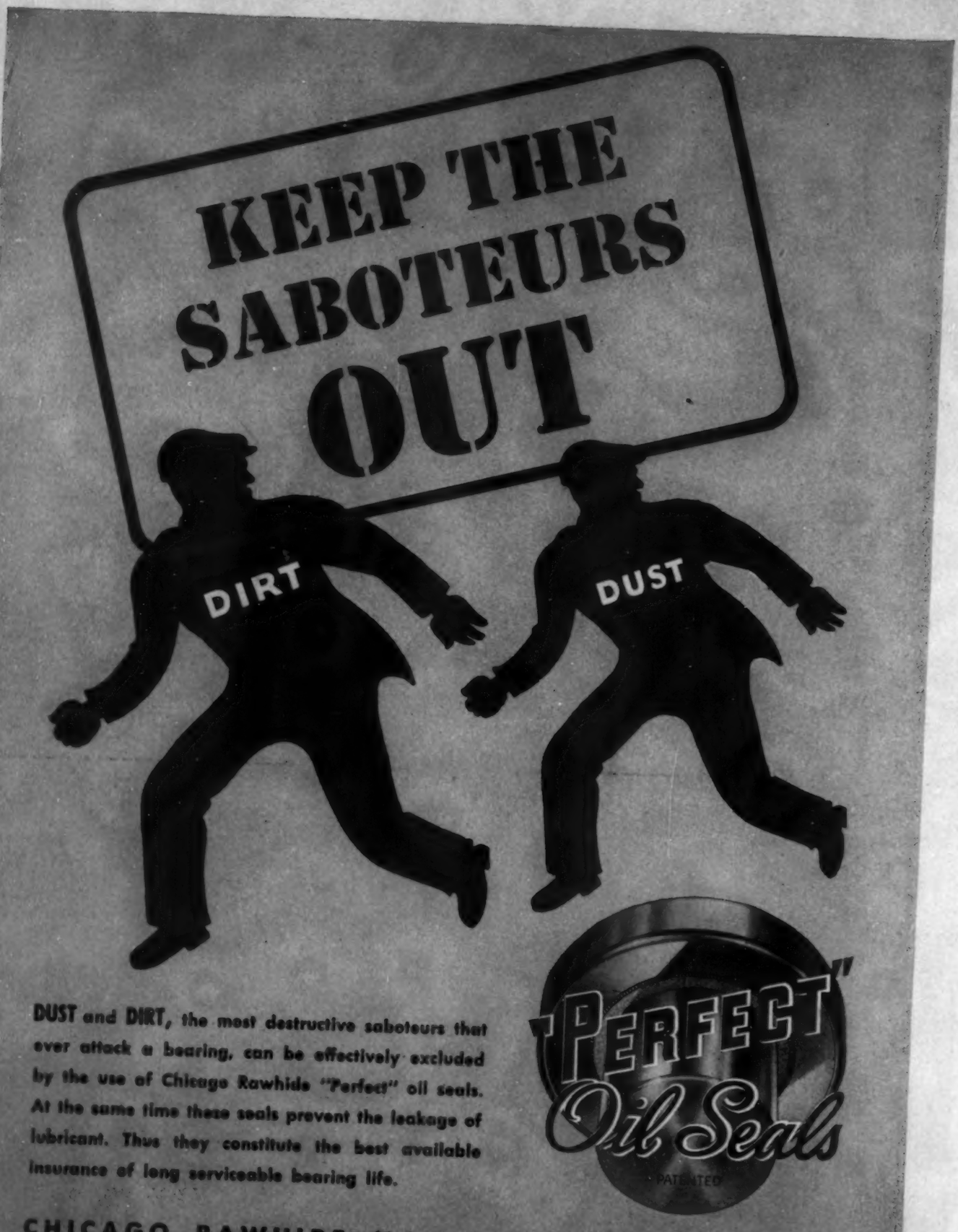

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Today the big swing is to alternating current welding . . . and here it is at its newest and finest in Allis-Chalmers' new Ampac "200" Note how much more the new Ampac gives you in savings, faster work, better welds!

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1 No arc blow to slow down welding.	Steady arc makes sound, uniform welds. You can weld in corners and grooves easily. Production is speeded.	YES	YES	YES	YES
2 Low striking voltage at high amperage.	Saves power for you. No need for high voltage at high currents. Raises power factor — cuts power input.	YES	NO (75 volts)	NO (75 volts)	NO (75 volts)
3 High striking voltage at low amperage.	Strikes arc fast. Gives you high, yet safe voltage necessary. Makes a-c welding easy at low currents.	YES	NO (72 volts)	NO (75 volts)	NO (75 volts)
4 Takes less than 300 sq. in. floor space.	Small size saves valuable space on crowded shop floors . . . makes it easier for you to move and handle the unit.	YES	NO (sq. in.)	NO (308 sq. in.)	YES
5 Contains less than 5 wearing parts.	Cuts maintenance to simple lubrication twice a year. Less chance for wear means longer service, lower upkeep.	YES	NO (8 or more)	NO (6 or more)	NO (8 or more)
6 Low original cost (no rotating element).	Simpler construction of a-c welder cuts purchase price to around 65% of what you would pay for a d-c welder!	YES	YES	YES	YES
7 Wide welding range of over 200 amperes.	You can weld thin sheets . . . yet have capacity for heavy plates, too. You can use rods from 1/16" to 1/4" in size!	YES	YES	NO (195 amp.)	NO (195 amp.)
8 Reconnectable for 220-440 & 208 v., 60 cycle.	Gives you full capacity at low voltages where lines are long and isolated. Can be used on *any* standard a-c voltage!	YES	NO (220 or 440)	NO (220-440 only)	NO (220-440 only)
9 Over 85% efficiency at normal loads.	You enjoy *full* benefits of a-c welding: lower power loss, high power factor, lower operating costs!	YES	NO	YES	YES
10 All settings within six control turns.	Saves welding time. Welder can make simple adjustment from high to low amperage current quickly and easily.	YES	NO (50 turns)	NO (30 turns)	NO
11 Movement of variable part 2" or less.	Cuts wear and maintenance to a minimum. Reduces hum and vibration Contributes to trouble-free operation.	YES	NO (6 inches)	NO (6 inches)	YES
		11 Ampac "200"	3 Welder "B"	3 Welder "C"	5 Welder "D"

Only Ampac gives you all 11 . . . TOTALS

ALLIS-CHALMERS AMPAC "200" WRITE ALLIS-CHALMERS MILWAUKEE WIS. FOR COMPLETE INFORMATION

A1489

STAINLESS STEEL

STAINLESS steel is playing an important role in Allied war production. Our aircraft, warships and motorized units utilize this strategic material. Production of chemicals, explosives and synthetic rubber is facilitated by use of stainless steel equipment. In many other fields, where high tensile strength and resistance to heat or corrosion are demanded, stainless steel is specified.

As America's largest and only exclusive producer of stainless steel, Rustless is filling a substantial portion of these wartime needs. Rustless is doing more. Through use of its unique process, Rustless is conserving America's limited resources of chromium and electrolytic nickel. This is important, because the stainless steel industry is the largest consumer of low-carbon ferrochrome and electrolytic nickel, both of which are among the most critical of strategic materials.

The Rustless Process is based on the use of sub-grade chrome ore and stainless steel scrap, of which there are adequate supplies in this country. More than 65% of the nickel used by Rustless is obtained from scrap, while only 3% of its chromium comes from low-carbon ferrochrome. Thus Rustless is not only meeting wartime demands, but through its conservation efforts is also assisting greatly in meeting the critical supply problem of these two metals.

These advantages of the Rustless Process will be of equal benefit in meeting a greatly expanded use of stainless steel after the war. When that time comes, Rustless will be ready with a fund of new technical knowledge and specialized experience to devote to the problems of peace.

RUSTLESS IRON AND STEEL CORPORATION, BALTIMORE, MD.

RUSTLESS

CORROSION AND HEAT-RESISTING STAINLESS STEELS

It's another job for the AMPLIDYNE

A sheet of paper varies a ten-thousandth in thickness and a giant paper machine instantly changes its pace—

A strip of steel speeds by at 25 miles an hour and a flying shear jumps into action to cut 33-ft lengths with an accuracy of 0.1 per cent.

In industry after industry, small electrical signals such as the power output of photo and other electronic tubes, are working "miracles" in the control of processes and product quality—with the aid of G-E AMPLIDYNES.

Within less than 1/10th of a second, the amplidyne can magnify a 1-watt signal from vacuum tubes, pilot generator, or other source into a powerful 10,000-watt working output. Thus it can assume the duties of heavy-current contactors, and eliminate many other conventional control devices.

The amplidyne will not change characteristics or get out of adjustment. Yet it is immediately adjustable to meet changed production requirements. Similar to conventional m-g sets, it is sturdy, long-lived, presents no unusual maintenance problems.

The versatile amplidyne is finding wide and dramatic use in automatic control of voltage and current, speed and acceleration, torque and tension, thickness and width, color register—even in finger-tip positioning of massive machinery. New uses for it appear almost daily wherever an electrical signal can express the need for a change in an electrical operation.

A G-E application engineer will gladly suggest how the amplidyne fits in with your plans for present and postwar production improvements. Call on him through our local office. *General Electric, Schenectady, N. Y.*

THE STORY OF THE G-E AMPLIDYNE

This 36-page book tells how the amplidyne works and describes typical applications. Send for your free copy of "The Short Circuit That Moves Mountains" today.

GENERAL ELECTRIC

MUSIC WIRE

BY

WASHBURN

Washburn wire makers are skilled craftsmen who have been schooled by long experience in the highest standards of quality workmanship. Talent and the most up-to-date equipment produce clean, uniform wire . . . straight throughout the coil, and held to close tolerances in all physical requirements.

The operations of making Eagle Music Wire are exercised with extreme care. To maintain a bright, clean surface, the finished wire is handled with gloves to prevent perspiration marks which lead to rust and finally to surface pitting.

Specify Eagle Music Wire for superlative quality.

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Advertisement JUNE, 1943

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

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Hot Forged Parts Display Superior Strength, Ductility

The hot forging process for the fabrication of non-ferrous parts has won increasing favor in recent years because of the superior physical properties resulting in the finished part. Compared with castings, hot forgings have greater strength, ductility, and impact resistance. They are generally tougher also, because of their freedom from the porosity found in many castings. The forging process tends to close up any voids which existed in the original cast billet, and the combined heating and working refines the grain structure, thus producing a tougher product.

Another feature in the growing popularity of hot forging has been the introduction of copper alloys characterized by exceptionally high mechanical strength in the hot forged conditions. Most of the copper alloys acquire their strength largely as a result of cold working. In such an alloy as Duronze III, however, the high mechanical strength is an inherent property rather than an artificially produced one. Duronze III is therefore particularly adaptable to the production of unusually strong parts by the hot forging process.

Memos on Brass—No. 39

Brass is one of the most useful of engineering materials because its physical properties can be varied over a wide range to meet the requirements of specific applications. These variations in properties can be effected by changing the copper-zinc ratio, by the addition of small quantities of other elements, or by mechanical means.

Annealing Step Important in Fabrication of Brass Goods

Selection of Correct Equipment Essential in Attaining Satisfactory Results and Maximum Economy of Operation

Use of the correct annealing equipment is a factor of primary importance in the fabrication of many types of brass goods. Each job usually presents an individual problem, and because of the many types of equipment available, and the considerations that influence their selection, fabricators frequently find it advantageous to consult the skilled technicians in Bridgeport's laboratories.

Up-to-date annealing furnaces, selected with a view to the job in hand, will be found, in the long run, to be more economical than the continued use of outmoded or inadequate equipment. Correctly selected equipment will pay for itself in reduced costs of operation and in the higher quality of product.

Factors Influencing Selection

Annealing equipment is not necessarily complex. Where requirements are small, a relatively simple type of manually operated furnace will usually suffice, provided it is equipped with a pyrometer for indicating the annealing temperature. The recording type of pyrometer is to be preferred, since it provides a record of the temperature of the annealing cycle.

Where annealing requirements are more extensive, the use of automatically controlled equipment is desirable. The most modern types of furnaces include equipment for performing a number of other operations besides the actual annealing.

Cleaning and Pickling

It should be kept in mind that work to be annealed should be free from drawing and lubricating solutions. Such work can be readily cleaned after annealing and pickling. On the other hand, work that is greasy before annealing will remain dirty and spotted after annealing and pickling.

For this reason, modern conveyor type furnace equipment is provided with a precleaning chamber which removes the drawing lubricant before the work enters the furnace proper. To conserve handling time and floor space, such furnaces are also equipped with quenching, acid pickling, washing, and drying chambers at the exit end. Equipment of this type is particularly well adapted for the manufacture of long runs of the same type of part, such as brass small arms and artillery ammunition.

Method of Firing

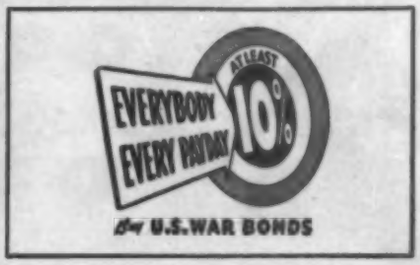
Small manually operated furnaces are generally gas-fired. Larger equipment may be gas- or oil-fired with automatic temperature controls. Electrically heated furnaces are also used in some localities. Whatever the source of heat, the work is brought up to the required temperature, and in the process becomes discolored through oxidation. This discoloration must be removed by cleaning with dilute sulphuric acid.

Bright annealing furnaces are also available for annealing copper, gilding metal, and commercial bronze without scaling. Here a controlled reducing atmosphere surrounds the metal during the annealing operation, and provision is made for cooling the metal down to room temperature without allowing it to become oxidized.

Local annealing, such as is required for softening the mouth of a brass cartridge case, is generally done by partly immersing the article to be annealed in a molten salt bath. For a stress relief heat treatment (to remove internal stresses resulting from cold working operations) finished cartridge cases

(*Continued on Page 2, Column 2*)

Laboratory tests on the corrosion resistance of copper alloys are constantly carried on at Bridgeport, supplementing field studies as a guide to the development of new and improved alloys to meet modern service requirements.



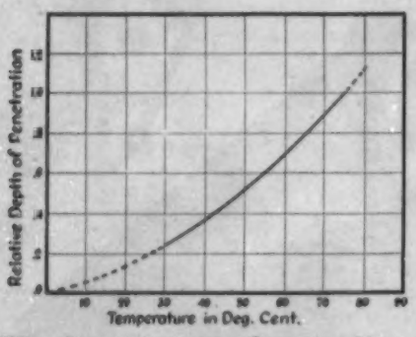
CAUSES OF CORROSION

This article, dealing with the influence of temperature, is the eighth of a series of discussions by C. L. Bulow, research chemist at Bridgeport Brass Company.

INFLUENCE OF TEMPERATURE

Before discussing the influence of water compositions upon the corrosion rate of metals, it will be well to recall that heat accelerates practically all of the reactions involved. Qualitatively, it may be said that a temperature rise of the corroding solution of about 20° C. will double the rate of corrosion. The effect of temperature is not always so pronounced, but in some cases it is even more so.

The change in corrosion rate with temperature generally depends on the nature of the corroding medium. The accompanying curve shows the relationship in the case of brass in a 3% NaCl solution.



Effect of temperature on rate of corrosion of brass in 3% NaCl solution

The influence of temperatures is one of the reasons that many power plant engineers keep a record of incoming and outgoing cooling waters in condenser installations, because it is recognized that a unit operating at too high a temperature may fail prematurely. The higher temperatures of cooling waters during the summer is also one of the factors contributing to more rapid summer corrosion.

Instances have been reported in which new condenser tubes installed during the winter season have given longer service than tubes installed in summer. This difference in performance occurs because of the type of protective film which forms. The corrosive film which forms on a metal in cold water is generally thinner and more continuous than one which forms in warm water. In warm and hot water the susceptibility toward pitting generally increases substantially. As a result of pitting, the useful life of a condenser tube may be considerably shorter than that indicated by the over-all corrosion rate, as evaluated by loss in weight or in tensile strength.

On the other hand, an increase in temperature may lead to the precipitation of calcium carbonate and other types of scales on the metal surface. These scales, when continuous, often confer consider able protection on the underlying metal. This scale formation is due to the decrease in solubility of certain minerals in the water with increase in temperature.

Bulletin Index for 1942 Now Available

A complete index of all articles which appeared in the COPPER ALLOY BULLETIN during 1942 is now ready for distribution to readers. The index is thoroughly cross-referenced to facilitate its use, and includes a complete listing of all items which appeared in the New Developments column.

Copies of the index may be obtained free of charge by writing Bridgeport Brass Company on your company letterhead.

Annealing Equipment

(Continued from Page 1, Column 3)

are also completely immersed in molten salt. Stress relief heat treatments can also be carried out in special continuous recirculating gas-fired furnaces.

It will be seen that the correct selection of furnace equipment depends on many factors: operations involved, length of production runs, continuous or intermittent use, composition of alloys. Bridgeport metallurgists will aid fabricators in weighing all of these factors.

Preventing Hot Breaks

"Hot breaks" in brass—intercrystalline cracks resulting from a combination of heat and stress—can be prevented by observing simple precautions. A detailed explanation of the causes and prevention of hot breaks was given in the January, 1941, issue of the COPPER ALLOY BULLETIN, copies of which may be obtained from Bridgeport.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A thread milling machine is described as especially suitable for threading operations on the nose of 75 mm. shells. It is equipped with an air-operated chuck of capacity up to 3 inches in diameter, and all driving elements, electrical controls, and coolant system are enclosed in a rugged structure. **(No. 450)**

A new connector is designed to serve as a substitute for soldered and taped joints in electrical wiring, according to the manufacturer. Connectors are said to use no rubber, tin, or lead, and to provide a satisfactory joint both electrically and mechanically. It is said that the insulation on the connector will not puncture at 10,000 volts. **(No. 451)**

A vernier height gage is made in three sizes of 12, 18, and 24 inches and is available in metric as well as in English measure. It is said to be designed particularly for use in jig and fixture making and for general layout and inspection work. It is described as a valuable adjunct to gage blocks in angular measurements and other operations where a high degree of accuracy is necessary. **(No. 452)**

Hole saws of fine-tooth design, said to be suitable for working on non-ferrous sheet, are made in a range of sizes from ⅜ to 4 inches. Sizes are in steps of 1/32 inch up to 2 inches, then 1/16 inch up to 3 inches, and ⅛ inch up to the maximum of 4 inches. **(No. 453)**

A forming machine is reported to be capable of rolling edge forms on both sides of a flat sheet in a single pass. Assembly is available to specification as to sheet width. One model will handle thicknesses to 22 gage, another to 16 gage. A variety of edge forms can be produced, and the manufacturer is prepared to furnish the proper rolls for a specific job. **(No. 454)**

A new polishing lathe is provided with a clearance hole through the entire machine. This feature, according to the manufacturer, permits polishing a portion of a long piece of work up to the maximum capacity of the lathe. Work can be loaded and unloaded while the spindle is in rotation, and a switch and mechanical brake control are provided to facilitate handling of work which can be loaded better when the spindle is stationary. **(No. 455)**

Metal hammers for machine shop and assembly line work are being produced with light or heavy heads. Construction consists of a cast bronze head with a hickory handle. Weight of heads ranges from 5 ounces to 8 pounds. **(No. 456)**

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,* for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers, oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

"Bridgeport" BRASS

Established 1865

COPPER WATER TUBE—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* For plumbing, underground and industrial services.

BRIDGEPORT BRASS

Note: Bridgeport products are supplied in accordance with existing priority regulations.

*Trade-name.

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USED IN 99% OF ALL AVIATION PLANTS
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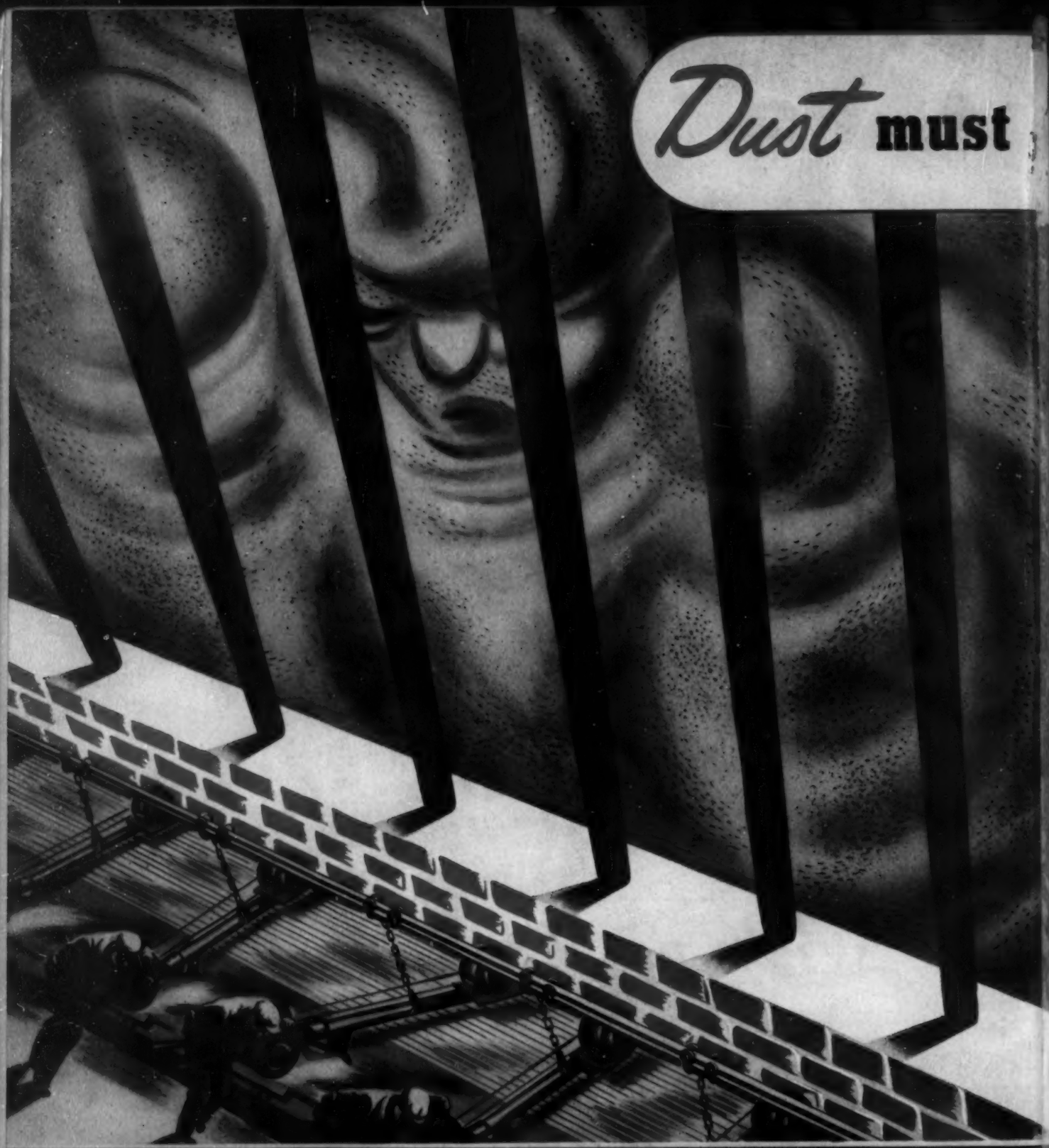

Sturtevant Systems

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AND EQUIPMENT

ENGINEERED FOR PRECISION-VENTILATING, HEATING, AIR CONDITIONING, DRYING, DUST AND FUME CONTROL, PNEUMATIC CONVEYING, MECHANICAL DRAFT

get life imprisonment in 194V

Under the lash of all-out production, Industry has learned many new reasons for keeping a close watch on Dust—and its treacherous ally, Fumes. Utilizing the most advanced development of Sturtevant Air Research and Engineering, industry has been able, through effective air control, to boost output, pare down operating costs, and improve product quality—to a degree never before thought possible.

Take the manufacture of aircraft engines, for example. Destructive dust from buffing and grinding operations must be whisked away as soon as it leaves the wheels. But there's an extra twist that Sturtevant Air Engineering gives this job. Instead of carrying off and wasting the conditioned room air, it's whirled through dust separators, purified and returned to the room with all its valuable heat intact. Savings at the coal pile run as high as $8,000 a year.

In giant booths where motorized equipment is spray painted, you'll find another Sturtevant dividend. Controlling the toxic fumes that spurt from spray guns was not enough. All air entering the room is now purged of dust or anything else that could impinge on freshly painted surfaces. Repainting was minimized and the production line went into high gear.

Processing metals at Victory-speed and efficiency calls for still another touch of Sturtevant genius. Acid fumes, destructive enough to eat through steel beams and keep labor turnover as high as 50% are now precision-controlled. Absenteeism is down to normal, costly equipment safeguarded and production quotas reach a new high.

And there are hundreds of new products, such as the miracle of making artificial wool from cow's milk, born with an inherent fume control problem that Sturtevant had to lick before production could be achieved.

Remember, all these advantages of dust and fume control—that are helping turn out better war goods, faster and more efficiently—will be equally important when industry returns to competing for postwar markets. Without "air at work," no plant can expect to compete on an equal footing.

ENGINEERED AIR will make a difference.

Yes, air that is engineered to serve efficiently—not only in dust and fume control but in all phases of industrial air conditioning, heating, ventilating, drying, pneumatic conveying, and mechanical draft—will make the difference between profit and loss in many a plant. And with new war-won knowledge, backed by experience as the pioneer in air-handling, Sturtevant will be in a position to find the most efficient and economical solution to your problems.

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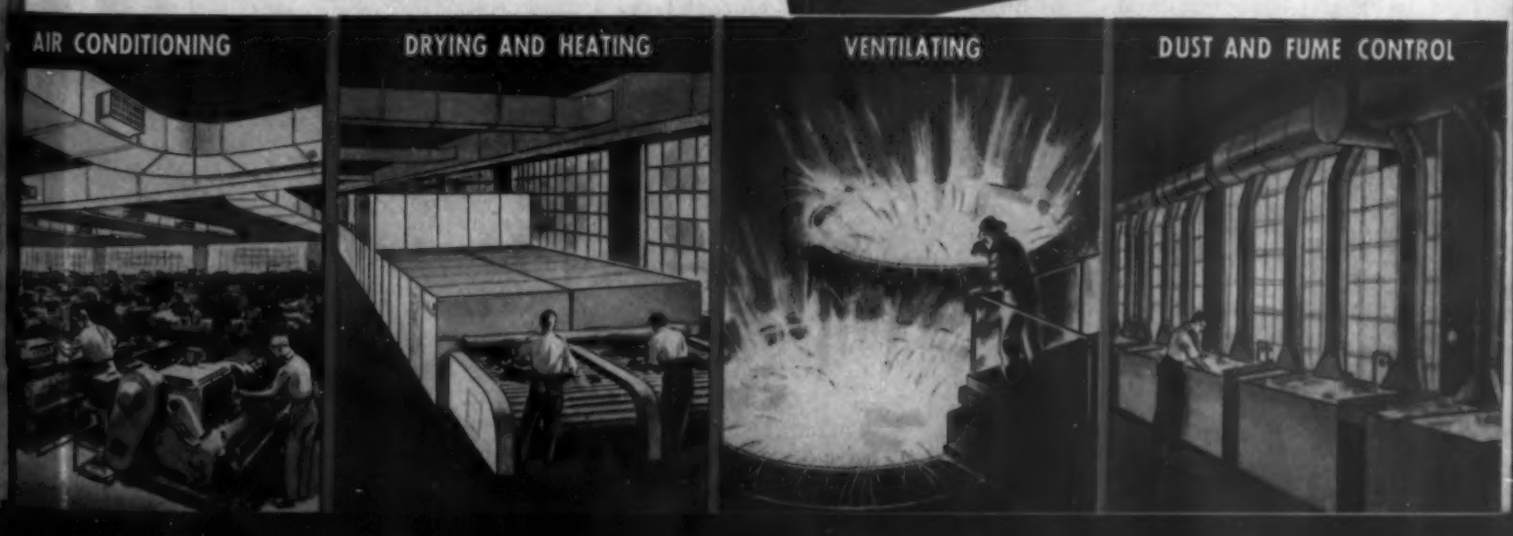
Puts Air to Work



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Guaranteed to minimize tool breakage . . . save time and materials . . . and help inexperienced operators produce more, faster.

In every detail, Apex safety friction chucks are *right*. Made of finest material for the job, precision built throughout. Easy to adjust, and once adjusted, maintain proper tension over long periods. End thrust set up by tapping or pressure exerted by the operator does not affect friction setting. Friction disc element can be replaced quickly and at low cost when necessary. Used for tapping thru and bottom holes, drilling, reaming, stud setting, nut setting, spot facing, counterboring . . . wherever tool is apt to break. Shanks supplied for all requirements. Tap capacities up to 3". Considering today's conditions, reasonably good deliveries are obtainable.

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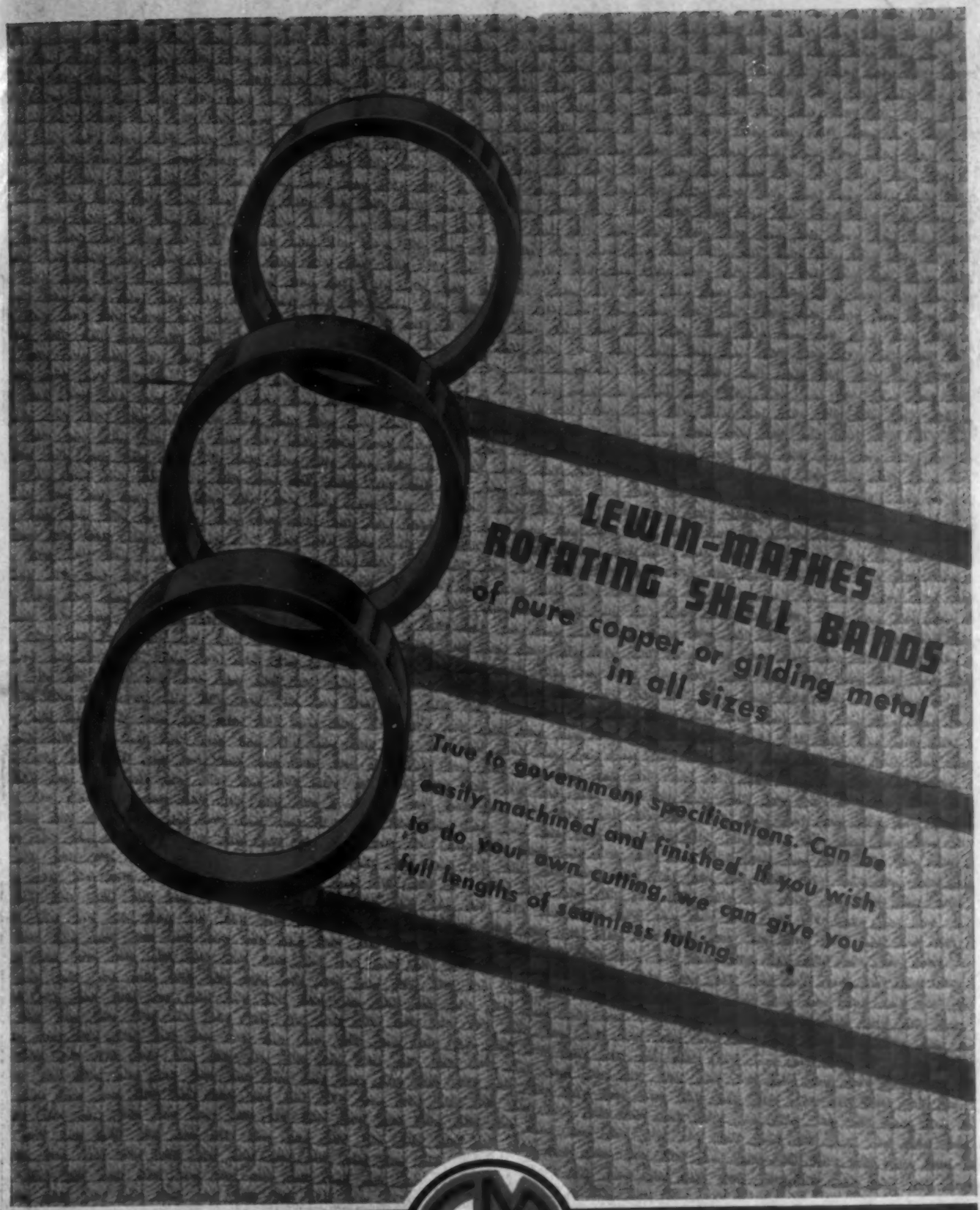
Manufacturers of friction chucks, quick change chucks, positive drive chucks, vertical float tapping chucks, semi and full floating tool holders, stud setters, screw drivers, power bits, universal joints, plain and universal joint socket wrenches.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True to government specifications. Can be
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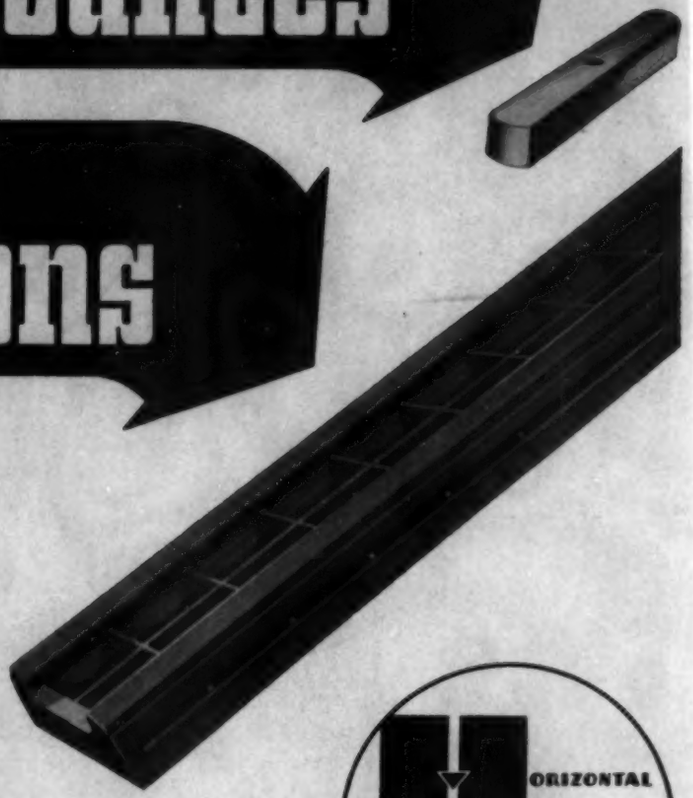
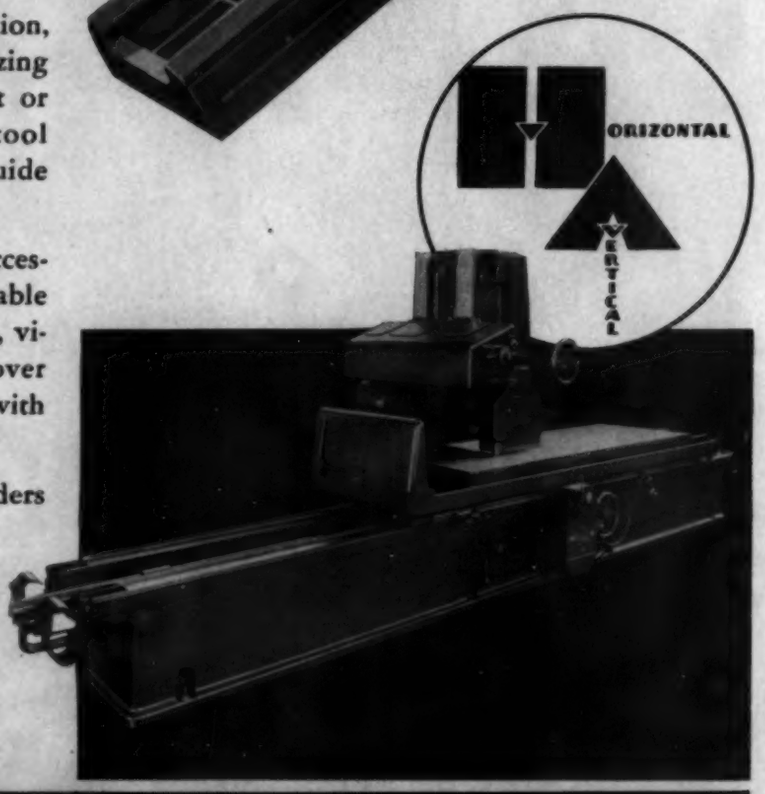


The HILL "Open Side" Horizontal Spindle Surface Grinder will produce a finished surface on a small key or a large casting to exacting tolerances

Here is a Heavy Duty, Hydraulic, Precision, Surface Grinder that demonstrates amazing versatility and accuracy in finishing flat or irregular surfaces such as machine tool ways, dies, links, plates, die blocks, guide bars, cams, etc.

"Open Side" design affords maximum accessibility to the work — Fully hydraulic table and cross feeds insure smooth, positive, vibrationless operation. Proven savings over previous methods run as high as 90% with corresponding increases in production.

HILL "Open Side" Hydraulic Surface Grinders are built in both Horizontal Spindle and Vertical Spindle design and in varying table sizes to accommodate all classes of work within the scope of this type of machine. Bulletin HV-3 gives complete details.



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"Harper Bolts don't rust. They're tough and they'll make this pump last a lot longer."

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FOR STEEL

TITANIUM ALLOY MANUFACTURING COMPANY announces the production of two Boron-containing alloys for imparting deep hardenability to steels and for the conservation of other elements less available today than in other years.

It is necessary to introduce only minute amounts of **Boron** in fine-grained forging steels in order to obtain surprisingly intense hardenability, good ductility and superior toughness, as well as high strength (after hardening and drawing at low temperatures, such as 450° or 600° F.)

To realize these highly desirable qualities, only a few pounds of "BORTAM" (a complex alloy) are needed per ton of steel. (Note: "Bortam" is restricted to war production applications only.)

An exceedingly economical alloy to use in steel to produce deep hardenability, as well as other superior physical properties, is "CARBORTAM" (a less complex high-carbon alloy containing Boron and the well-known nitrogen stabilizer, Titanium.)

ANALYSIS

"BORTAM"	
Ti	16-18%
Al	13-15%
Mn	22-24%
Si	20-23%
C	Less than 1%
B	1.5-2.0%

"CARBORTAM"	
Ti	16-17%
Si	2.50-3.00%
C	6.5-7.5%
B	1-1.25%

FOR FURTHER PARTICULARS FOR APPLICATIONS TO MEET YOUR SPECIFIC PROBLEMS, WRITE TO:

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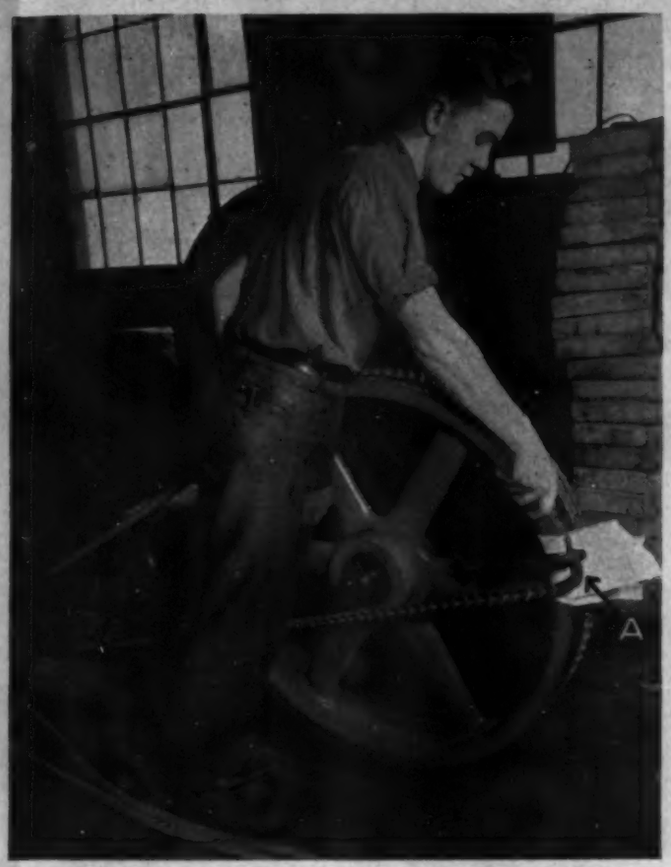
PRODUCTION



Position of correct length Veelos V-belt before drive is turned.

DO what he's doing . . . install Veelos . . . the proved and practical V-belt . . . and you'll gain the advantages of a *peak* production drive. Construction of the Veelos link provides quick, easy tension adjustment to end slippage . . . keeps machinery running at full speed and productivity. Install Veelos and make the most of your machines and manpower.

FREE! COMPLETE, NEW VEELOS PRODUCTION MANUAL!

This free manual—"Drive Production Higher with Veelos V-Belt"—gives complete instructions on use, length table, engineering data, detailed description of Veelos link construction. Shows how to measure, couple, uncouple any size of Veelos. Write today for your copy of this valuable reference.

IMPORTANT INSTALLATION DIRECTIONS

Sizes 3/8", A, B and C Veelos V-belts must be 1" per foot short of pitch length.

Sizes D and E Veelos V-belts must be 3/4" per foot short of pitch length.

Measure one belt on floor or bench from end rivet to first empty hole. Make up all other strands with the same number of segments.

1. After correct length has been determined, place belt in nearest groove of small sheave.

2. Place belt in nearest groove of large sheave as far as it will go to point A in illustration.

3. With SMALL sizes *hold belt with hand* at point A and turn drive until belt is in groove all around. With LARGE sizes *hold belt with "C" clamp or rope; put cloth pad* between belt and sheave rim.

4. Turn drive until belt is in groove all around. (Caution: *Always turn drive manually.* If necessary, a bar can be used for leverage.)

5. Work belt across to inside grooves by turning drive. Repeat until grooves are filled.

Veelos is made in all standard sizes (3/8", A, B, C, D, E) . . . fits all standard V-belt grooves

VEELOS

THE LINK

V-BELT

ADJUSTABLE TO ANY LENGTH
ADAPTABLE TO ANY DRIVE

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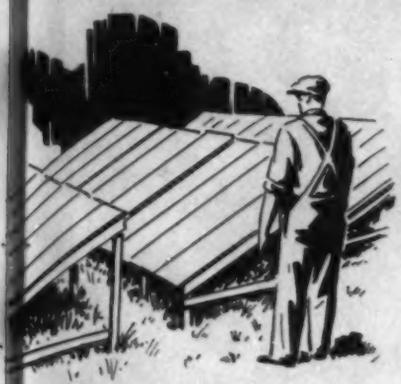
HAS MANY Virtues

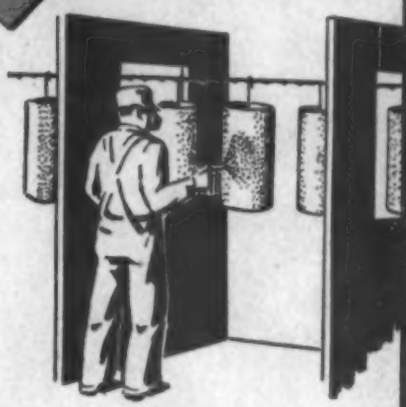


IT HAS *Greater* RUST-RESISTANCE

Lead does not corrode or weather away through galvanic action when in contact with steel. Properly applied, a lead coating for steel sheets affords longer-lived protection against rusting or corrosion of the base metal.

IT *Takes* PAINT

The new lead coating provides an ideal painting surface. LEAD-SEALED sheets TAKE and HOLD paint and synthetic enamels without preparatory treatment. This saves both time and cost in manufacturing operations.



IT SOLDERS *Easily*

Continental LEAD-SEALED solders fast and easily, and without the use of flux or acid. Less solder is required. Being both simpler and easier than soldering zinc-coated sheets, there is a worthwhile saving in time and effort.

IT'S *More* WORKABLE

Softer, more ductile, LEAD-SEALED sheets possess a high degree of workability. The coating serves as an effective lubricant for dies. It withstands severe forming operations without flaking or peeling.

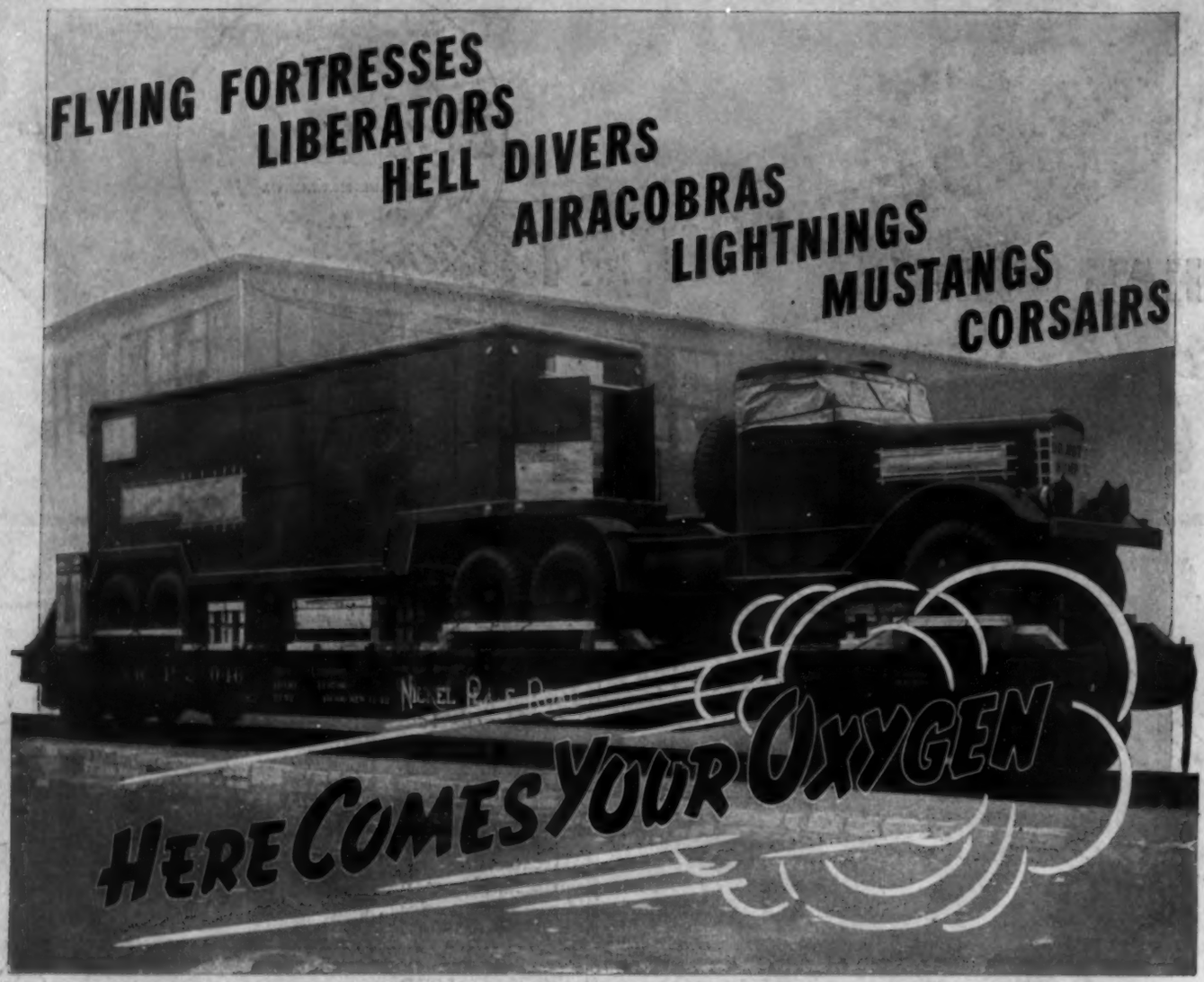
Already this new sheet has demonstrated superior properties for such uses as: truck and trailer bodies, fire doors, heating and ventilating equipment, chemical containers, gasoline cans, tanks and a score of other products. In many industries, Continental LEAD-SEALED has replaced more critical materials and actually cut costs. LEAD-SEALED offers advantages for many kinds of products. It cannot and is not intended to replace galvanized or long terne sheets for all purposes. The better acquainted users have become with LEAD-SEALED, the better they like it for specific uses for which it is intended. Perhaps this new sheet is your answer to a better product. Write, explain your problems, ask for a sample.

CONTINENTAL STEEL CORPORATION • KOKOMO, INDIANA

CONTINENTAL SUPERIOR STEEL

SUPERIOR

CONTINENTAL STEEL CORPORATION



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Independent Engineering Co.

105 WEST SECOND STREET—O'FALLON, ILLINOIS

Above: Pump liners for marine service.

Below: Special castings.

Variety of maintenance parts

SHENANGO-PENN

Centrifugal Castings

. . . an improved process for many products

BECAUSE it is an extremely flexible process, the use of centrifugal castings has multiplied many times under wartime production demands.

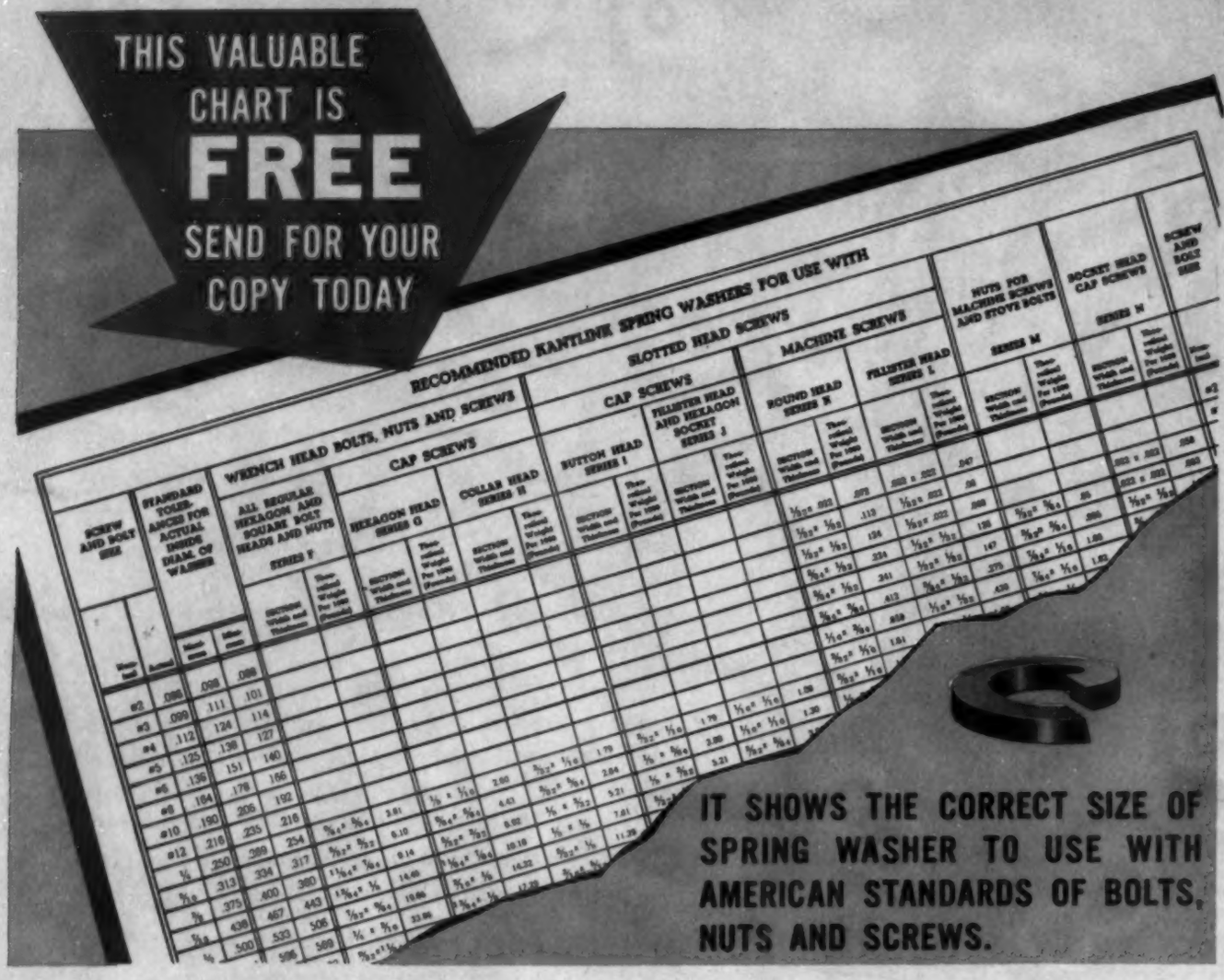
Wherever wheels turn, or corrosion or wearing problems exist, Shenango-Penn castings can probably be used. In marine service and the aviation industry, for example, parts formerly forged, are now cast centrifugally, and in many cases are giving better service.

Shenango-Penn castings have unusual advantages in strength and purity, and actually save production time because less machining is required on the finished product. Why not send for a copy of our new Bulletin No. 143 which describes the Shenango-Penn process and products, and gives a complete table of alloys available?

SHENANGO-PENN MOLD COMPANY

411 WEST THIRD STREET, DOVER, OHIO

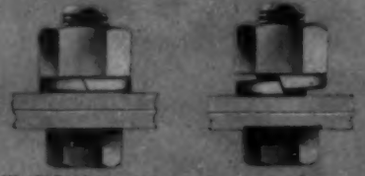
Executive Offices: Pittsburgh, Pa.


THIS VALUABLE CHART IS FREE SEND FOR YOUR COPY TODAY
RECOMMENDED KANTLINK SPRING WASHERS FOR USE WITH
IT SHOWS THE CORRECT SIZE OF SPRING WASHER TO USE WITH AMERICAN STANDARDS OF BOLTS, NUTS AND SCREWS.

These tables deserve most careful consideration. They result from many years experience and research in cooperation with the testing staffs of industrial concerns and the mechanical engineering laboratory of one of America's largest universities. Please write on your letterhead for a free copy.

A strong spring washer is essential on practically every bolted assembly. But for greatest economy, efficiency and for safety —you should use the correct size as shown on this chart.

Even if you welded the nut and bolt into one immovable mass, vibration would wear the assembly loose—unless you used a strong spring washer.



Yes it's still tight because a strong spring washer held it tight by expanding as fast and as far as inevitable wear tended to loosen the parts.

There is no substitute as economical. No fixed nut nor any short-range multi-toothed washer can possibly equal the great holding power of a long-range live spring—a big helical spring such as Kantlink. Write today to

THE NATIONAL LOCK WASHER COMPANY, Newark, N. J., U. S. A.

P&H TRAV-LIFT CRANES

SPEAKING OF TEAMWORK

"We've teamed up for peak production. I press buttons and the P&H Trav-Lift moves the loads from here to there in a hurry."

That's typical of the important part P&H Trav-Lifts are playing in war production. And everywhere, there is increasing recognition of what modern materials handling equipment can do in speeding production, eliminating worker fatigue, cutting costs.

P&H Trav-Lift Cranes provide an extremely flexible handling service. They enable you to move any type of load from any given point to any other within the area they serve, without rehandling. Available in sizes up to 15 tons capacity with either cage or floor control. Literature on request.

General Offices: 4411 W. National Avenue, Milwaukee, Wis.

HARNISCHFEGER
CORPORATION
ELECTRIC CRANES • EXCAVATORS • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

ARMY E NAVY

A new star has been added to P&H's award for excellence in war production.

Trunnion pickling basket that drains quickly, completely . . . custom-made by Rolock, Inc., Bridgeport, Conn. Monel used for ease of welding, strength and resistance to corrosive effects of pickling (sulfuric) acid solution.

Monel Pickling Basket that cuts down drag-out losses

Rolock builds trunnion basket for quick, easy and complete drainage

All arc-welded of Monel, this pickling trunnion basket may be rocked or revolved over the pickling bath, thus draining all liquid and minimizing drag-out losses. Weighing only 130 lbs., it holds from 400 to 800 lbs. of 40 mm. steel shell cups which are pickled in a 10% sulfuric acid solution.

Since standard mill forms of Monel can almost always be used when building to specialized designs, Monel is a logical choice for pickling equipment. It is readily fabricated by all customary shop methods.

When welded, it retains its full strength and corrosion-resistant properties. Its unique excellence for pickling equipment assures long, trouble-free life with fewer costly shutdowns for repairs. For further information on the use of Monel in the pickling room, write:

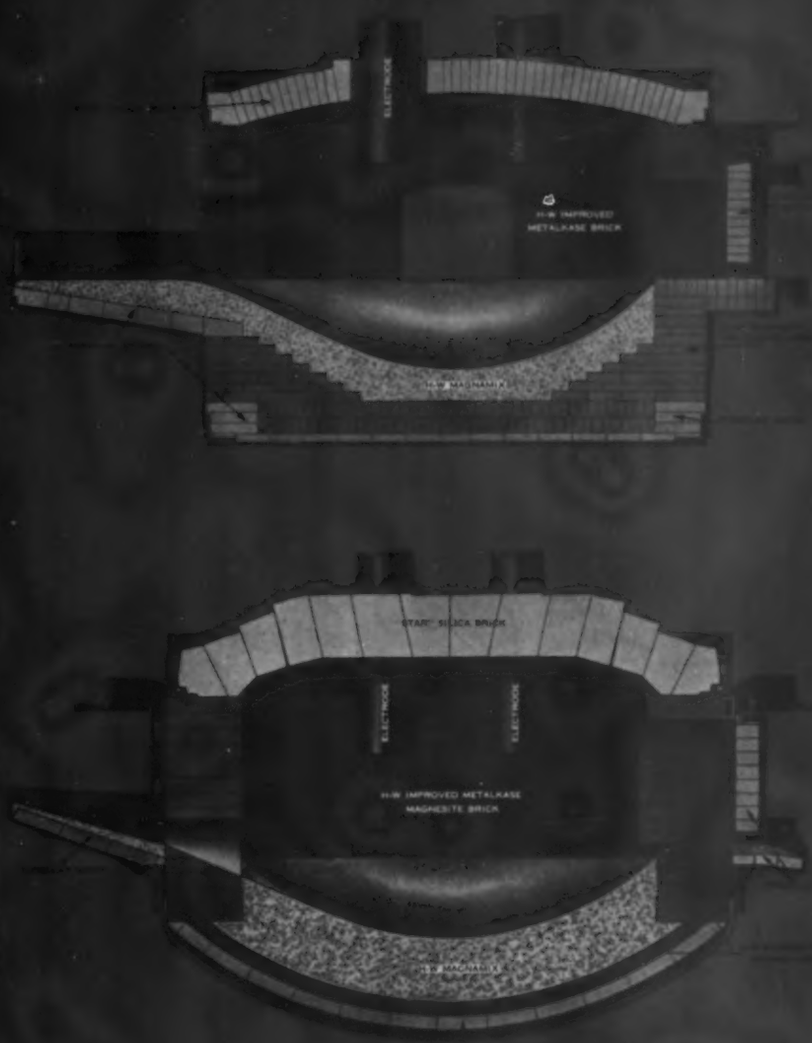
THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

INCO NICKEL ALLOYS

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL

Sheet...Strip...Rod...Tubing...Wire...Castings

Production Records are being made *with*



H-W *improved* METALKASE LININGS

The durability of H-W Improved Metalkase linings

in electric steel furnaces is reflected in the increased tonnages being produced in the many plants where they are established. Since operating conditions unavoidably vary widely from plant to plant, comparisons of tonnages may be quite misleading. However, a report has just been received from one plant giving a total of 639 heats and a production of 20,409 tons of steel with a furnace having a 9-inch lining of H-W Improved Metalkase. It further states that there was no necessity whatsoever for patching during the furnace campaign.

We confidently believe that a comparison of H-W Improved Metalkase brick with other types of refractories in like service will definitely demonstrate their superiority.

H-W MAGNAMIX • A Magnesite Ramming Mixture for Basic Furnace Bottoms • Easy to Install • Economical • Durable

HARBISON-WALKER REFRACTORIES COMPANY

AND SUBSIDIARIES • WORLD'S LARGEST PRODUCER OF REFRACTORIES • GENERAL OFFICES, PITTSBURGH, PENNA.

THE MOTCH & MERRYWEATHER COLD SAWING MACHINE USING THE Triple-Chip METHOD

Does More Work FASTER!

Ask for Our Latest Blade Bulletin "S-6"

IF THE cold sawing of metal was once in a degree a problem, the operation has long since definitely passed into the category of work well provided for. Two Motch & Merryweather Cold Sawing Machines handle practically any kind of metal, ferrous or non-ferrous, single or multiple, up to 16" round or 14-1/2" square. They cut fast and clean, giving square ends without burrs, without scrap, at production rates that surprise experts. This is accomplished by the Motch & Merryweather Triple-Chip Method of cutting—by a blade with the distinctive Hi-Lo principle of tooth design plus many other noteworthy features . . . *Only Motch & Merryweather builds all 3;* the blade itself, the saw that uses it and the machine that sharpens it. Write for our well illustrated bulletin.

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
Penton Building • • • Cleveland, Ohio

The M & M Automatic Saw Sharpener evolves the correct, cam-generated tooth contour.

Built by MOTCH & MERRYWEATHER

THE MOTCH AND MERRYWEATHER MACHINERY CO.
CLEVELAND DETROIT
CINCINNATI PITTSBURGH

VICTORY COBALT

This new Class A High Speed Steel is the answer to the demand for increased cutting service on heat treated steels as well as cast iron.

Victory Cobalt serves the war effort by combining unusual cutting ability and long wear with the conservation of strategic alloys.

Vanadium-Alloys

STEEL CO. LATROBE, PA.

Silent PARTNER

FOR FASTER, STRONGER, RESISTANCE WELDING

VITAL MATERIALS SAVED

Eliminates rivets. No flux or solder required.

INCREASED PRODUCTION

Fewer welds are necessary when all are of uniform strength. Less preparation and finishing required.

FEWER REJECTS

Accurate control of timing eliminates weak welds and burned material.

Electronic control is a natural partner for resistance welding. It gives micro-accuracy in the variables that go into making strong, precision welds—weld time and heat. It controls high currents noiselessly, efficiently.

Westinghouse supplies all the necessary equipment for electronic control of resistance welding. Two typical units are illustrated above, mounted on a spot welder.

- **WELD-O-TROL** "makes and breaks" heavy welding currents as high as 10,000 amperes with no arc, no noise. Complete absence of moving parts eliminates the noise and maintenance of mechanical contactors.

- **AUTOMATIC WELD TIMER** controls duration of weld and sequence of electrode operations. Precision control to within one cycle or 1/60 of a second produces welds of uniform characteristics—even in mass production.

Specify Westinghouse controls to improve both production rates and consistency of weld quality. Ask your Westinghouse representative for recommendations and descriptive literature. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-21274

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

RESISTANCE WELDING CONTROLS

AWARDED TO REPUBLIC DRILL AND TOOL...

"For Great Accomplishment in the Production of War Equipment"

THESE ARE TIMES when young and vigorous companies grow swiftly to maturity in the service of their country.

An "acorn" of industry in 1940, Republic Drill and Tool has grown into a mighty oak in its field, with an "E" Award that will spur its growth to new heights for victory.

In conferring the Award, Undersecretary of War Robert Patterson said: "For great accomplishment in the production of war equipment, this symbolizes your country's appreciation of the achievement of every man and woman in your plant. . . . I am confident that your outstanding record will bring victory nearer by inspiring others to similar high achievement."

The ability to deliver—on time—essential products of high quality in large quantity, has made Republic Drill and Tool one of America's largest manufacturers of high speed twist drills.

Republic's advanced conceptions, methods and machines have greatly increased production of these vital tools, so necessary in the manufacture of *all* war equipment using metal or plastics.

Today, we shall supply with ever greater zeal the needs of those who use our products for war. Tomorrow, our skill and experience will supply their needs in making the products of peace for a new free world.

REPUBLIC DRILL AND TOOL COMPANY

Makers of CENTURY and FEDERAL High Speed Drills

322 South Green Street, Chicago, Illinois

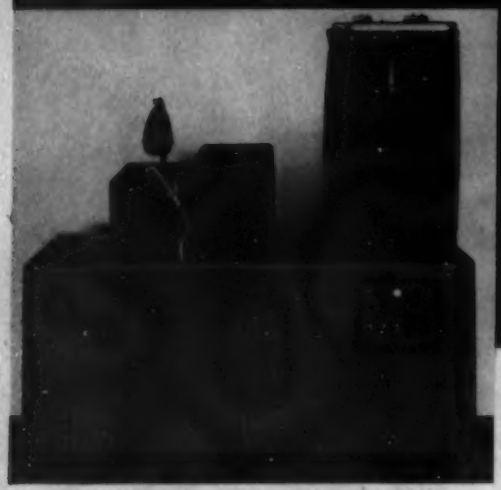
In Republic's two plants shown above, 1800 workers are turning out millions of High Speed Twist Drills every month.

OUT OF THE DARKNESS COMES

Zyglo

(REG. U. S. PAT. OFF.)

TO PUT THE FINGER ON FAILURE



Complete Zyglo Inspection Station ZA-2D for small volume or laboratory.

The New Inspection Method Now Ready To Speed Your Output of Perfect Parts

(Non-Magnetic as well as Magnetic)

● Zyglo Black-Light Inspection now takes its place beside the original Magnaflux Method as Industry's means of predicting areas of probable failure *in non-magnetic parts.* Announced some months ago, Zyglo has been put on a production-line basis in selected plants where it was needed most under war conditions. Aluminum castings (and other light metal parts) for the warplane program have had the finger of Zyglo indications put on them before assembly—before they carry a defect into finished products—long before the possibility of failure in battle. Another factor in the supremacy of American arms!

In the illustration, here, of aluminum castings—dipped in a penetrant fluorescent liquid, then rinsed, dried powdered and observed under black light—serious shrinkage cracks were shown up. The glowing fluorescent indications signal the exact locations in which the penetrant remained during rinsing, then developed finally on the surface under capillary action by the powder.

Zyglo, with its laboratory years behind it, has met the test of the production line with thoroughly practical results: *Clear, easily interpreted indications. Routine handling without delaying the flow of work. Big direct savings of labor, wasted when defective parts are assembled. Enormous indirect savings through prevention of failures.*

To fit Zyglo into the routine of factory or overhaul shops a line of equipment has been developed. A complete compact unit is shown here. All other units give larger capacity. Not only the practical equipment is available to licensed Zyglo users, but the full Magnaflux Service. This amounts to a continuing consulting and engineering service on flaw detection.

A great percentage of American manufacturing will find applications for Zyglo in the competition of the final war and early postwar years. You are urged to contact the Magnaflux Corporation to determine definitely the advantage of Zyglo in your plant. Write, requesting the new Zyglo Bulletin.

MAGNAFLUX CORPORATION

MAGNAFLUX CORPORATION

5912 Northwest Highway, Chicago

NEW YORK DETROIT DALLAS LOS ANGELES

Electroweld Steel Tubing

SAVES WEIGHT AND MEETS YOUR SPECIFICATIONS

Used where performance factors are vital

When there's an extra premium upon increased as well as sustained production, specification accuracy which is dependably maintained becomes of ever increasing importance to you. The solution to that need is found in Electroweld Steel Tubing. It is lighter in weight without sacrificing strength; hence, forming, cutting, and welding operations become decidedly faster and easier. No other method of tube manufacturing can provide you with such uniform wall thickness. Furthermore, the physical and chemical properties throughout the wall can be provided exactly as specified, thus meeting your most exacting requirements at all times. The excellence of surface and uniformity of diameter provide you with additional production advantages.

These Electroweld benefits are the result of manufacturing tubing of accurate-to-specification strip steel on America's latest and most modern tube mills. Every foot of every length of Electroweld Tubing is hydrostatically tested for safety and meets Government, A.S.M.E., as well as A.S.T.M. specifications. Today we serve the Armed Forces with tubing which has these benefits, and we trust that after the war you will take advantage of Electroweld's outstanding qualities.

SIX ADVANTAGES

Uniform diameter
Uniform wall thickness
Uniform physical properties
Tool-grooved welds
Scale-free, silver-bright finish
Square cuts, minimum burr

Electroweld STEEL · · OIL CITY, PENNA.

A Division of TALON, INC

Manufacturers of pressure and mechanical steel tubing

No Longer is "PHILOSOPHER'S WOOL" pulled over a Brass-Caster's Eyes

In the old days, a brass-caster stirring his crucible would often get a whiff of "Philosopher's Wool" from the boiling zinc . . . like steam from the fabled Philosopher's Stone . . . that would give him the "spelter's shakes". Yet it never occurred to him that the casting might suffer because of his passing staggers. For he did most of his work by smell or touch or some other rule of thumb. Then, brass was sold "as is", and no questions asked.

But there's no trace of fog remaining in brass-making practice today. At Bristol, any question asked by any brass-fabricator can be answered promptly and specifically . . . and the answer will hold good throughout any number of sheet, rod or wire shipments that are completed to the specifications agreed upon. Automatic production control, repeated laboratory checks, and searching physical tests guarantee that the customer gets his brass from Bristol exactly right for the job it has to do.

That's the way war-production plants all over the world are getting Bristol Brass today . . . in the ever-increasing quantities needed to seize the offensive on all United Nations fighting fronts. And when the war is won, Bristol will have a lot of new knowledge to put to work for the products of peace.

BRISTOL BRASS

★ *Buy War Bonds to Buy Brass for Bullets* ★

THE BRISTOL BRASS CORPORATION, MAKERS OF BRASS SINCE 1850, AT BRISTOL, CONNECTICUT

STRAIGHTENS THE MOST DIFFICULT SHAPES!

MEDART'S HIGH PRODUCTION
shape straighteners

★ HEXAGON BARS

★ SQUARE BARS

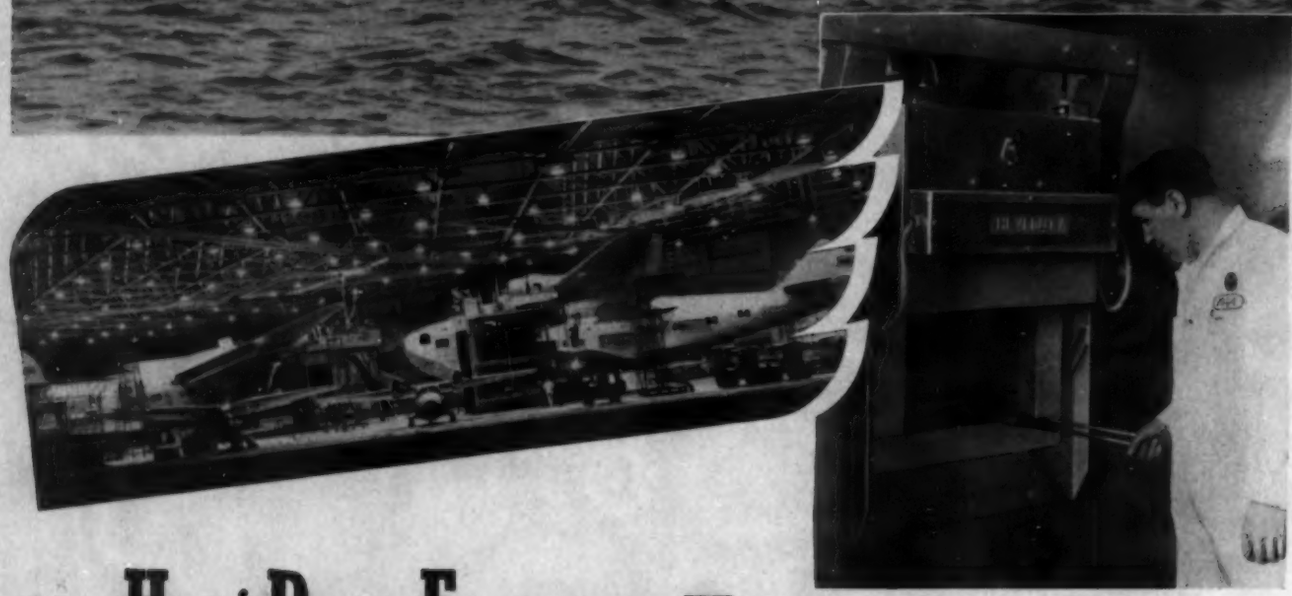
★ FLAT BARS

(TYPE LS)

Combination type rolls handle square, hexagon and flat cross sections . . . no roll changes necessary! Insured precision because of multiple straightening cycles in *two* planes. Variable speed with 3-speed integral gear change unit. "One-shot" lubrication assures low cost maintenance. Adjustable span between rolls permits straightening large range of sizes on one machine.

Manufacturing Engineers of Complete Transmission Equipment and Specialized Machinery

MEDART



Hevi Duty Furnaces Help

Service Pan American Equipment ★ ★ ★ ★

In the round the clock servicing routine of the 42 Ton transatlantic Clipper Ships at Marine Base, La Guardia Field, Hevi Duty Furnaces are used for heat treating important repair parts.

Send for Bulletins HD-934 and HD-441

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

When Considering Vanadium Ask for Electromet

Small percentages of Vanadium—0.05 to 0.15 per cent—can be used effectively to give steel extra strength and resistance to fatigue. The results are positive and predictable. Furthermore, the use of Vanadium may help to conserve other more critical alloys.

Electromet Ferrovanadium is made from domestic ores mined in adequate quantities at our Corporation mines, and is supplied in high-speed, special, and open-hearth grades.

Vanadium Has Many Applications —Ferrovanadium is used for making fine-grained steels having high dynamic strength, fatigue resistance, and wear

resistance. Such steels include high-speed tool steels, nitriding steels, and many engineering and structural steels. Vanadium oxide and ammonium metavanadate are used for making other vanadium compounds useful to the chemical industries. The costly platinum catalysts formerly used in manufacturing sulfuric acid, for example, may be replaced by a vanadium compound.

Vanadium Improves Transverse Properties —In certain grades of ordnance steels where transverse test requirements are exacting, small amounts of Vanadium (0.05-0.10%) have a beneficial effect on the steel and give more positive results.

Vanadium Steels for the Railroads —Fine-grained, shock-resistant vanadium steels are used for such engine and railroad car castings as main frames, crossheads, pistonheads, wheel centers, driving boxes, rocker arms, equalizers, truck frames, bolsters, and brake rigging. Wrought vanadium steels are used for

helical springs, elliptical springs, and other parts requiring high dynamic strength.

Vanadium Improves Steel Castings —In steel castings a small amount of vanadium . . . usually not over 0.10 per cent . . . refines grain, materially raises yield strength without sacrificing ductility, and greatly increases resistance to shock and fatigue. The addition of 0.10 per cent vanadium to a nickel steel was found to raise the yield strength from 53,450 to 69,900 pounds per square inch and increase the Izod impact from 35.5 to 74.3 foot-pounds.

Vanadium Gives Extreme Toughness To Tool Steels —Most high-speed tool

steels contain vanadium, for it gives these steels better forgeability and improved cutting efficiency. The presence of vanadium helps to maintain cutting properties at elevated temperatures.

• • •

If you need technical help in the use of Ferrovanadium or other ferro-alloys, our field metallurgists will be glad to help you. For more information about these alloys and this service, write for the booklet, "Electromet Products and Service."

BUY UNITED STATES WAR BONDS AND STAMPS

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

"Electromet" is a registered trade-mark of Electro Metallurgical Company.

PIPE helps American Industry

That's a job for NATIONAL Seamless Alloy Tubes—they are serving in many of America's leading gasoline refineries and synthetic rubber processing plants.

They move the heavy stuff on fast schedules. Locomotives like this "Big Boy" are kept on the job by NATIONAL Seamless Boiler Tubes which have shown extremely long life in service.

Power to produce
This is the secret of America's war strength. All industry depends on ability to keep supplying power without fail. NATIONAL Seamless Pipe and Tubes are doing their share in keeping Uncle Sam's power plants working "round-the-clock."

Plants of NATIONAL Tube Company have broken records again and again in meeting bigger production schedules for seamless airplane tubing.

Designed to deliver 300,000 barrels of crude a day to the east coast. The first unit from Texas to Illinois has already been completed, using 550 miles of 24-inch NATIONAL Seamless Pipe. Pipe for the second unit is now rolling from our mills.

UNITED

achieve production miracles

IN one short year, America has transformed peace plants to war plants and achieved literally impossible goals of production. The figures were so high that Germany, Italy and Japan scoffed at them as wild dreams. 60,000 planes, 8 million tons of shipping, 45,000 tanks did look like astronomical figures. But at the year's end, most of these goals were well within sight—some even exceeded. This year, at the present rate of production, they will be far surpassed—practically doubled.

Back of these production miracles is a story of men and machines working as they never worked before—a story of equipment pushed to the limit of its capacity with mighty little time out—and, basic to all industry, a story of power generated, controlled, and delivered by *pipe*.

As America's largest producer of seamless pipe and tubing, NATIONAL Tube Company's plants are delivering more tonnage than ever before in history. This is going into the ever-expanding program for more ships, more planes, more tanks, and hundreds of other war uses.

Every day our specialists are helping to work out solutions that keep plants operating longer, that make products lighter and stronger, that save thousands of pounds of steel. If you have a pipe problem in connection with war work, our experience is placed at your disposal without obligation.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

They get their power from boilers—each containing hundreds of seamless steel boiler tubes. NATIONAL plants have kept the supply flowing to meet huge increases in demand.

NATIONAL SEAMLESS

STATES STEEL

Official
U. S. Navy
Photo

Protect Your Cartridge Cases, Primers, and Other Steel Parts with EGYPTIAN CLEAR PHENOLIC BAKING VARNISH Ordnance Dept. "Spec." AXS-736 Rev. 1.

This fast and economical special finish has been recently developed to give protection to the surfaces of ordnance parts now made of steel, such as percussion primers and the exterior and interior of shells and cartridge cases. Already it has passed the exacting tests of munition manufacturers and is standing up under the severe strains of actual service.

Following is a report we have received from the laboratory of a nationally known manufacturing concern*:—

"Mix—5 parts Varnish—1 part Reducer

Toluene	OK
Acetic Acid	OK
Ammonium Hydroxide	OK
Ethyl Alcohol	OK
Ethyl Ether	OK
Adherence	GOOD
Abrasion	OK
Salt Spray	OK

This material was applied and allowed to air dry 10 minutes after which it was baked at 350° for 30 minutes."

*Name on request.

For further information regarding this or other EGYPTIAN finishes contact Dept. S

THE EGYPTIAN LACQUER MANUFACTURING CO.
ROCKEFELLER CENTER—NEW YORK, N. Y.

EGYPTIAN
Superior FINISHES

This advertisement is one of a series appearing regularly in national periodicals, farm publications and prominent city newspapers. Reprints in color are available for your use. Write us for them.

BELLY FULL OF BULLETS—but every man alive!

Tex., reported not one man of the 10 aboard the bomber received as much as a scratch. One of the bomber's engines was shot up, however, and there were bullet holes in the fuselage. It was this bomber's first encounter with Jap Zeros. The plane crew include[d]

(clipped from a recent issue of the Cleveland Plain Dealer)

Unusual news? Once it was, but not today! Items like this are appearing almost every day—telling of the miraculous ability of American bombers to reach their objectives through a deadly hail of enemy fire—and return with every man alive.

★ ★ ★

American planes are proving their fighting ability in the skies over most of the globe. They can take it as well as dish it out.

Scores of American flyers in all parts of the world owe their lives to armor plate at vital points in planes—armor plate *tough* enough to stop enemy bullets and *light enough to fly* high.

The quality of these planes is a tribute to the American system of industry. The volume of their production is amazing—from 20,000 in 1941 up to 49,000 in 1942—more planes than we produced in the 23 years preceding this war.

This production job would not have been possible without vastly increased tonnages of the fine steels necessary for engines, fuselages, propellers, landing gear, armor and armament.

Free American industry has done a far greater war production job in two years than Hitler's "efficient dictatorship" could do in *ten* years! And not because we are a race of supermen, but because we are *FREE* men.

In these same two years, Republic's electric furnace capacity for making "Aircraft Quality" steels, light armor plate and other fine alloy steels increased more than 700%. Output of steel plates for ships was boosted 500%. A huge stream of peacetime products was diverted into a record-breaking flood of war steels and steel products.

Until we win the victory that will insure our American way of life—freedom to live as we choose, to speak, worship and work without fear or want—Republic will continue its "full-out" war effort.

After that, Republic will utilize its past experience, enlarged facilities and new knowledge gained in wartime production and in increasing research to provide more steel, finer steels to further enhance what we have always thought was the best Country in which to live.

You and we owe it to our sons and brothers in uniform that they shall return to an America that is worth their sacrifices—an America that will grow even greater and stronger because it is *FREE*. Let's see to it that our job is done—*WELL!*

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, N. Y.

Republic

ALLOY AND ENDURO STAINLESS STEELS

Sheets—Plates—Hot Rolled and Cold Drawn Bars—
Pipe—Upson Bolts, Nuts, Rivets—Electrunite Tubing

A POWERFUL WEAPON FOR INDUSTRY

THE *FAST* METAL CUTTING SAW

Wells No. 8

On industry's fighting front Wells Saws are among the busy weapons turning out our axis-beating equipment. They are working on the production line – in the tool room – on maintenance and odd jobs – cutting metals and other materials with speed and precision.

Wells Saws are rugged, versatile machines built for today's tough cut-off problems. And they will be the ideal all around saws for tomorrows jobs too!

Call your distributor or 'phone or wire direct – you can get quick delivery.

THIS NEW CATALOG

will give you all the details on the complete line of Wells Saws. Write for your copy – free, of course.

SPECIFICATIONS

No. 8		No. 5	
Capacity: Rectangle	8" x 16"	Capacity: Rectangle	5" x 10"
(spec. bowed guides)	5" x 24"	(spec. bowed guides)	
Rounds	8" dia.	Rounds	5" dia.
Speeds: feet per min.	60, 90, 130	Speeds: feet per min.	60, 90, 130
Motor	Specifications optional	Motor	Specifications optional

★ *Wells Has Established Leadership*

WELLS MANUFACTURING CORPORATION

Wells METAL CUTTING BAND SAWS

1515 FILLMORE STREET • THREE RIVERS, MICHIGAN

TURCO

SPECIALIZED INDUSTRIAL CHEMICAL COMPOUNDS FOR EVERY INDUSTRY

A few typical items of the 225 Turco Products specialized for your needs:

TURCO STRIPPER LS95
A non-inflammable paint remover. Safe, speedy, wax-free. Eliminates after-cleanup time.

TURCO AIRLION 81
An alkaline hot tank material. Insures a chemically clean surface before Anodizing and Chromatizing. Will not attack aluminum.

TURCO CARBRAX
Removes hard carbon and grease from all types of engine parts and pistons; also used in artillery overhaul and general industry.

TURCO POROKLEEN
Plater's cleaner for steel, electrolytically or otherwise.

TURCO SLIP
Removes zinc chromate primer by immersion. Non-inflammable, non-toxic, quick acting.

TURCO W. O. NO. 1
A Phosphatizing compound. Creates base for paint on metals. A substitute for Anodizing under many conditions.

TURCO PENETROL
Decarbonizing compound for aircraft and diesel truck engines.

TURCO MULSINE
Potent emulsifier and grease remover. Used cold for cleaning aircraft surfaces.

TURCO DURAMASK
Water soluble, cream colored masking compound, for paintroom floors. Dries to hard finish.

Consult your local Turco Service Representative or write the Main Office.

Many Turco Specialized Industrial Chemical Compounds have been an important factor in speeding up war production operations. Others have for years played a large part in plant maintenance.

Turco methods of surface preparation for anodizing, chromatizing and phosphatizing are standard procedure in many important aircraft plants.

Turco Decarbonizing and Degreasing Compounds and their methods of application are widely accepted for engine overhaul and maintenance.

The Turco laboratory staff of highly trained chemists and technicians is constantly developing new methods and materials to speed up war production.

Turco Field Engineers and the Turco technical literature and information service are helping all war industries increase production.

Check the operations in the coupon below on which you need help, and mail to the head office. No obligation.

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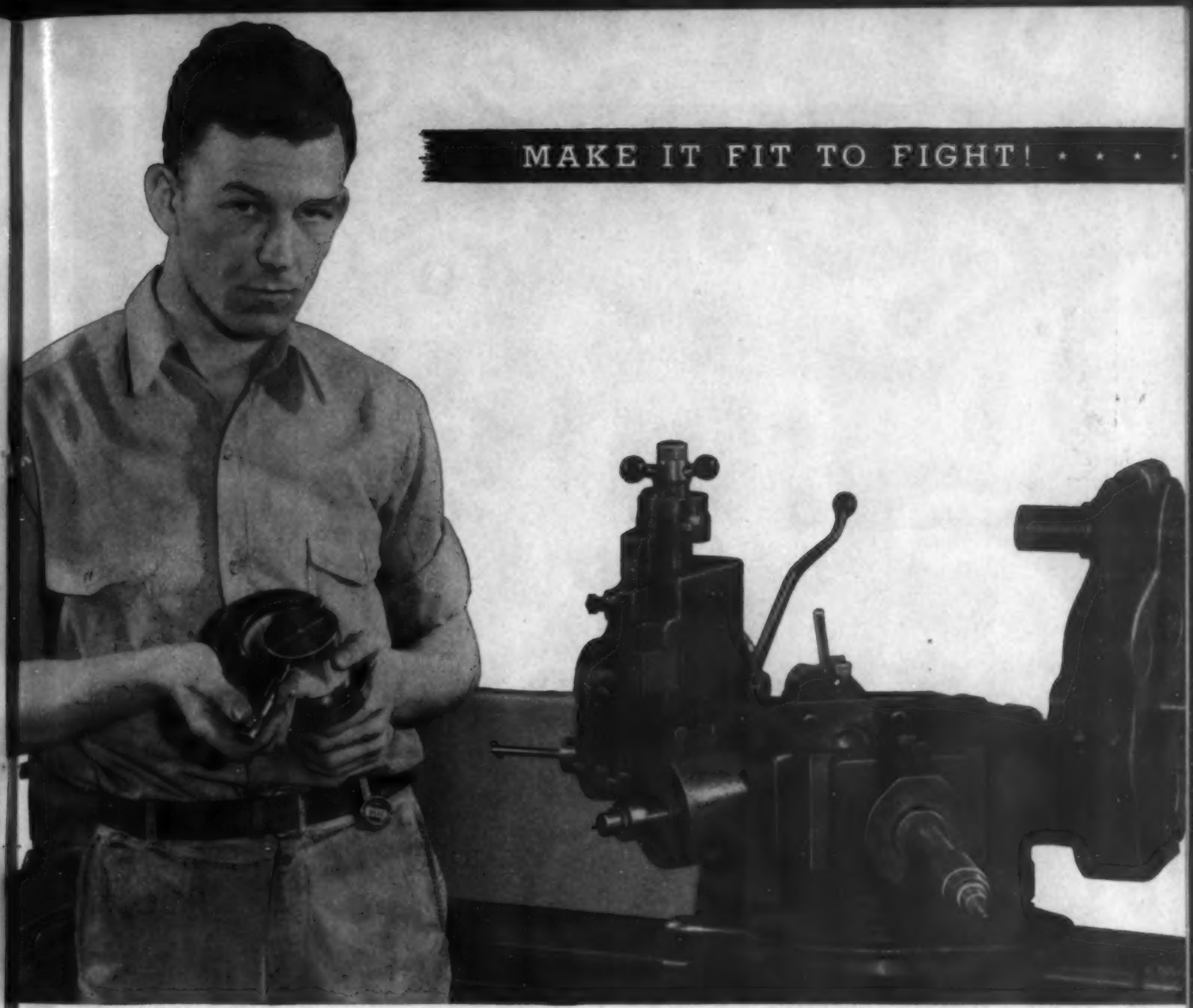

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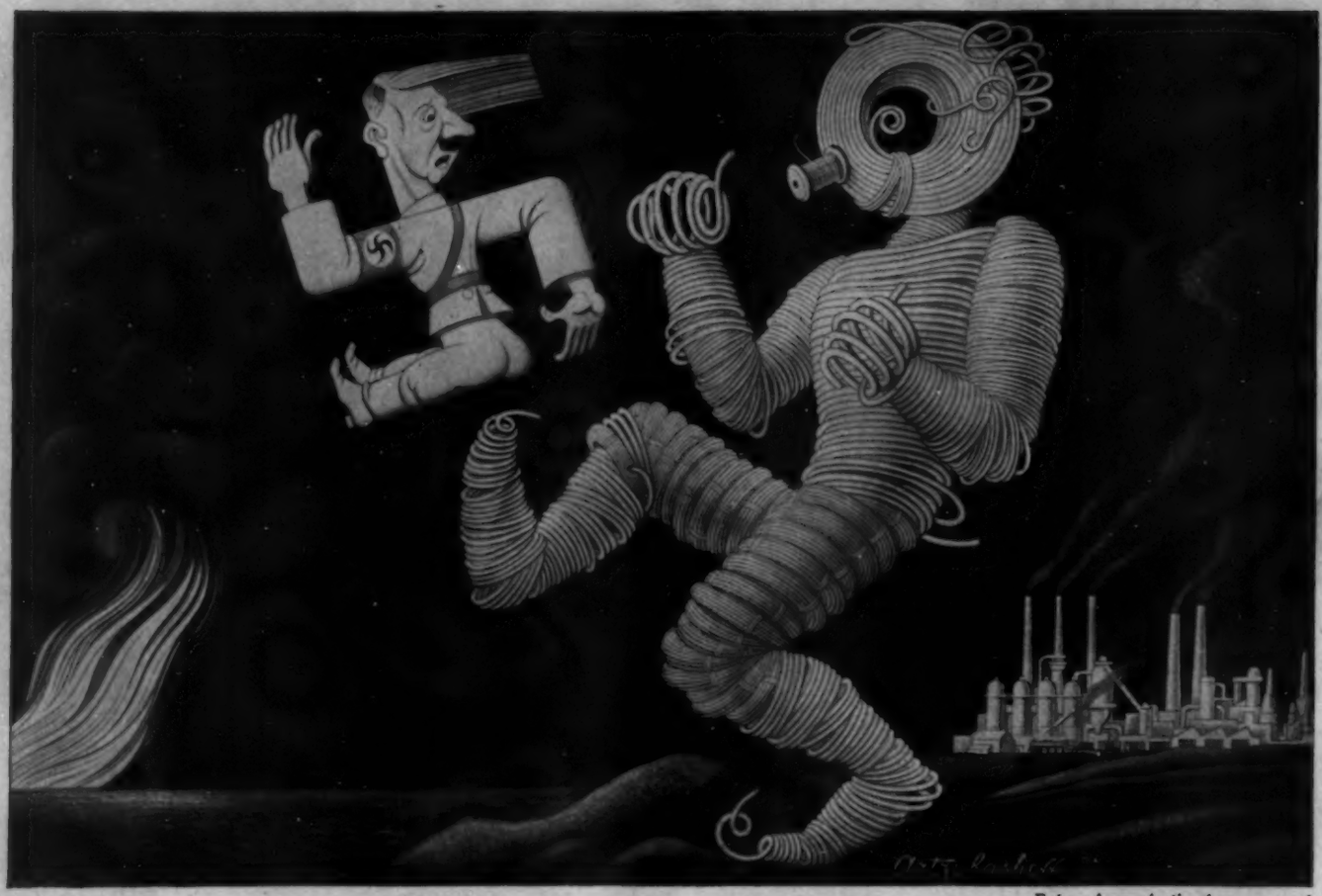

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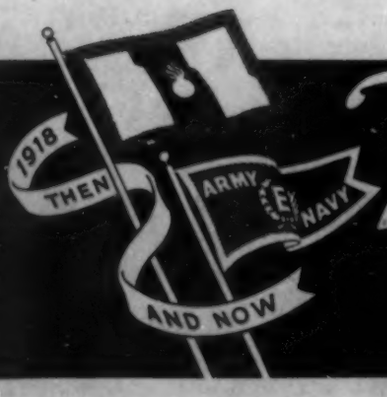

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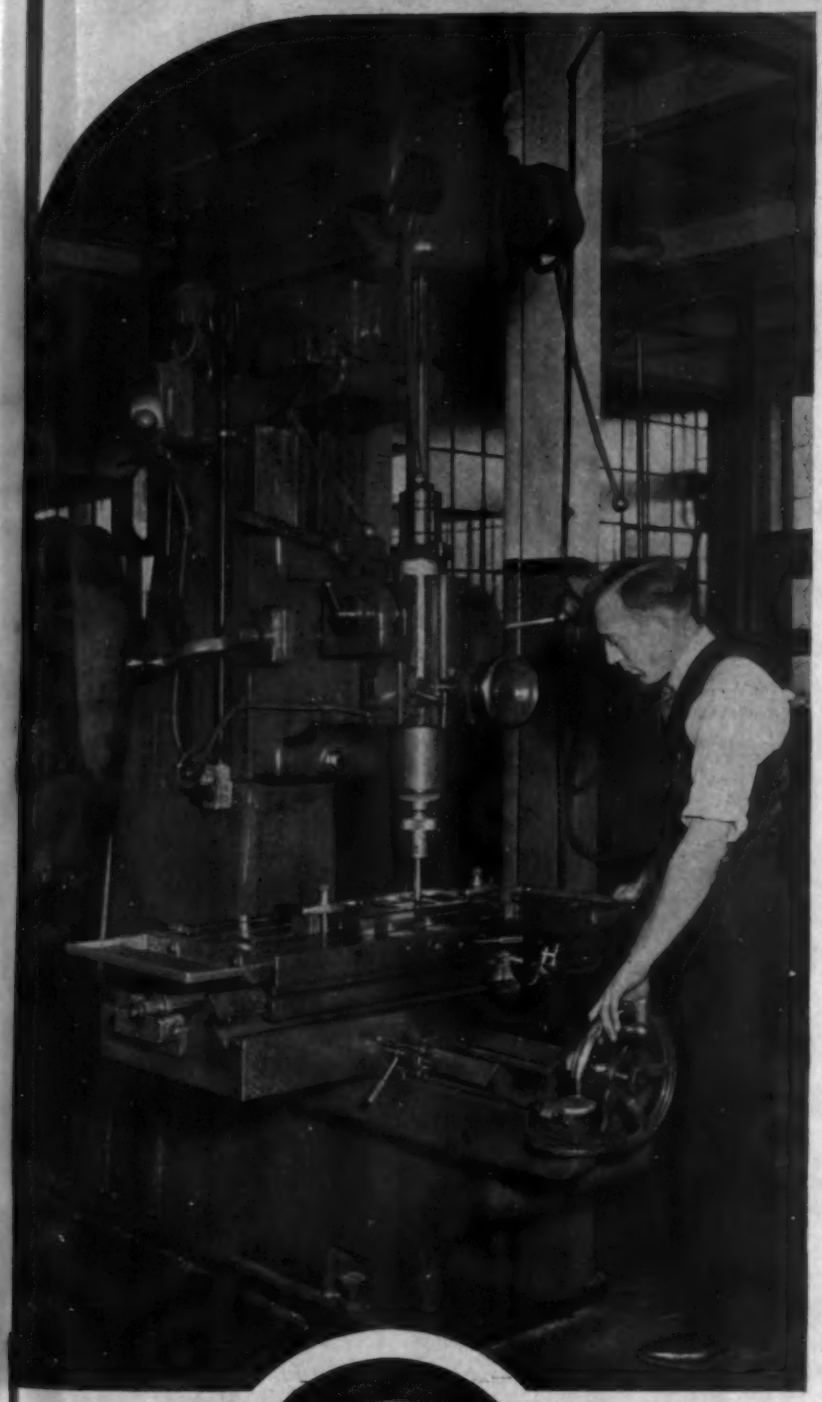

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Scales

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STEEL

The Magazine of Metalworking and Metalproducing

JUNE 14, 1943

Volume 112 *Number 24*

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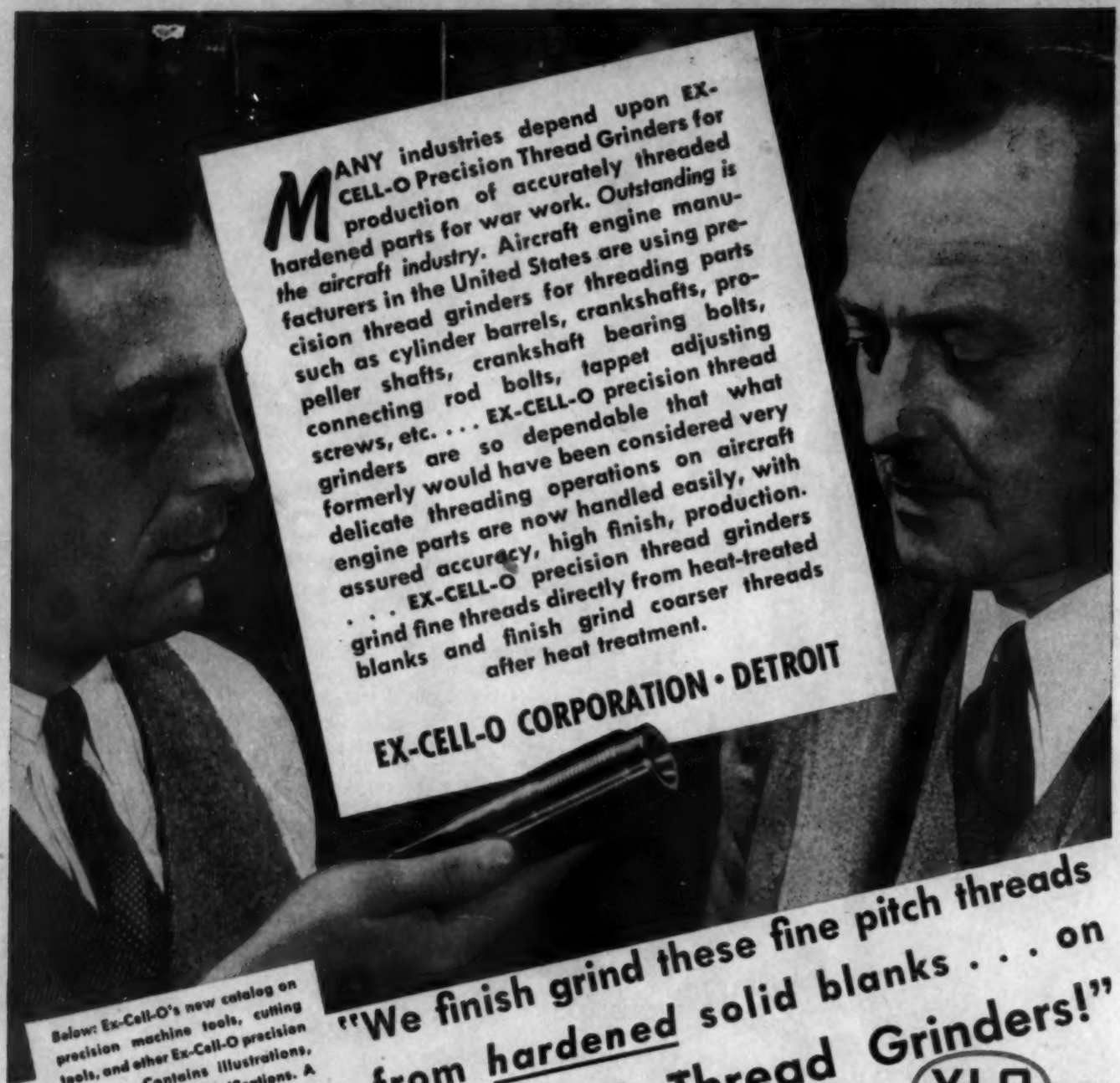
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AS THE EDITOR VIEWS THE NEWS

STEEL
June 14, 1943

EXTENDS CUTTER LIFE: One can never know in advance how the solution of a problem in one field may help to solve similar problems in other fields. Who would expect, for instance, that an alert engineer in a printing plant would discover a process which would find wide application in the metalworking industries?

Crowell-Collier Publishing Co., Springfield, O., faced the problem of extending the life of doctor blades which scrape off excess ink from the rapidly revolving cylinders on rotogravure printing presses. Blades of the best steel obtainable would stand up for only six to eight hours, after which they had to be reground.

In seeking a way to prolong the life of these blades, Axel Lundbye, chief engineer of Crowell-Collier, restudied some experimental work on chromium plating he had conducted in Copenhagen in 1913. Through further experiments he developed a process of plating and treating by which the chromium plate becomes an integral part of the underlying material. Doctor blades thus plated run 110 hours before they need attention. Whereas nickel plated electroplates are worn out after a run of 300,000 impressions, plates coated by Lundbye's new chromium process are still in perfect condition after a run of 1,300,000 impressions.

The process has been offered royalty-free to manufacturers engaged in war work. Hundreds of companies have tested cutting tools which have been chromium plated by the Lundbye process. Their experience proves conclusively (p. 100) that this method of treating cutters prolongs their life by at least 300 per cent. It is a brilliant contribution to the war effort.

• • •

PLAN STOCKPILING NOW: This week the American Institute of Mining and Metallurgical Engineers is scheduled to vote on a resolution (p. 90) advocating the accumulation by the government of an adequate reserve stockpile of critical minerals during the period of 10 years immediately following the end of the present war. The resolution is purposely general in character. It is designed to stimulate action on an important matter rather than to answer in detail the obvious questions regarding national stockpiles.

If this nation has learned anything from bitter experience, it has learned that the time to consider the storing of critical minerals is now— while the memory of our past follies still is fresh in our minds. In 1918, before the November armistice, Bernard Baruch suggested that Congress take action before the end of the war to store up certain materials for the next emergency. The advice went unheeded. After the war, the nation lapsed into complacency regarding the supply of minerals. Not until 1940, when the new war was about to involve this nation, did Congress authorize stockpiling.

We cannot afford to repeat the mistake of 1918. During the last third of a century the world has used up more minerals than in all previous years. We must be forehanded in handling our supplies of critical minerals.

• • •

DISABLED SERVICEMEN: It is not too early for industry to be preparing to employ disabled servicemen. Already the vanguard of honorably discharged men is returning to civilian life. Many of them are finding important jobs in industry.

To date the problem has proved fairly simple. Men released from military duty because of mild shell shock, malaria and other not too serious physical and mental ailments (p. 84) have found employment readily. However, as time goes on and as the number of rehabilitation cases increases, it will be necessary to develop a systematic program pointing to the effective utilization of the thousands of soldiers, sailors, marines and others who will be released because of wartime injuries.

A few industrial companies have been quick to see the opportunity presented by this situation. They are welcoming honorably discharged servicemen, realizing that most of them not only will prove to be good employes but also will exert a constructive influence upon the morale of all workers in the establishment.

The co-operation of industrial employers in the problem of rehabilitating disabled servicemen pre-

(OVER)

sents a challenge and an opportunity. We believe industrialists will be well advised to consider this matter seriously.

• • •

ACCENT ON AIR POWER: Donald Nelson's monthly report on munitions output for April is significant from two angles. It records an all-time high for war production in a single month (p. 70) and it indicates the importance the United Nations are attaching to the manufacture of aircraft.

On the assumption that munitions output in the pre-Pearl Harbor month of November, 1941, equals 100, the index for output in April, 1943, stands at 567. The value of the month's output was approximately $5,000,000,000. Of this imposing total, $1,649,000,000 represents the value of aircraft and aircraft parts and accessories produced in April. Thus 33 per cent of the productive effort of the arsenal for democracy is going into equipment for the war in the air.

Considering the marked superiority of Allied air power in all theaters of war during the past few months, the emphasis on aircraft production appears to have been wisely placed.

• • •

UNBALANCE BOTH WAYS: John Frey is one of the veteran labor union leaders in the country. He has spent practically all of his adult life in the union movement. He leans toward the conservative views of the late Samuel Gompers.

In an exclusive article written for STEEL (p. 76), Mr. Frey makes the point that employer and employe, or "capital" and "labor," while at odds on various issues, can unite wholeheartedly in their common zeal for the preservation of private enterprise. As a matter of fact, Mr. Frey states that the average A. F. of L. member is somewhat more concerned about the preservation of private enterprise than are some industrialists.

Mr. Frey stresses the importance of maintaining a proper balance in the distribution of the income derived from industrial operations. He cites the situation existing in the late twenties as a case of unbalance which tends to make people doubt the effectiveness or the fairness of the system of private enterprise. During that period, he points out, employes were not receiving their proportionate share of reward from industry's activities.

No reasonable person will disagree with Mr. Frey's assertion that the system of private enterprise must afford a fair distribution of rewards for work if it is to endure. Equitable distribution of benefits is a primary test for any system—communistic, socialistic or capitalistic.

However, those who complain about the inequities of the late twenties should in fairness agree that at present there is a strong tendency toward unbalance in the opposite direction. The government has put so many obstacles in the path of private investors that there is little if any incentive for a young man to go into business for himself.

This is as much a threat to Mr. Frey's union members as was the unbalance in the opposite direction in the late twenties.

• • •

KEEP THEM ROLLING: During the past two decades the iron, steel and metalworking industries have become accustomed to rely heavily upon highway transportation. The trucking lines have supplemented rail and water transportation systems satisfactorily.

Today highway transportation is threatened from several angles. Commercial truckers are handicapped by a shortage of experienced drivers and by difficulties in obtaining repair parts and accessories. Industrial companies operating their own fleets are confronted by similar problems.

A survey of a number of industrial districts (p. 65) indicates that these difficulties have resulted in impairments and curtailments in highway transport services which are beginning to affect shippers in the iron, steel and metalworking industries. Some large fleets which have been specializing on the hauling of iron and steel products have been reduced drastically. In some districts warehouses have been inconvenienced through inability to obtain reliable trucking service.

From the standpoint of the efficiency of the war effort there is no possible advantage in skimping the truck lines too severely. Every ton of essential freight which the trucks can't haul must be carried by the railroads or by water and these facilities already are overburdened. It would seem that WPB somehow must divert just a trifle more material and equipment to the rail and highway transportation systems. They must have it if they are to keep the trucks and trains rolling.

E. L. Shaner

EDITOR-IN-CHIEF

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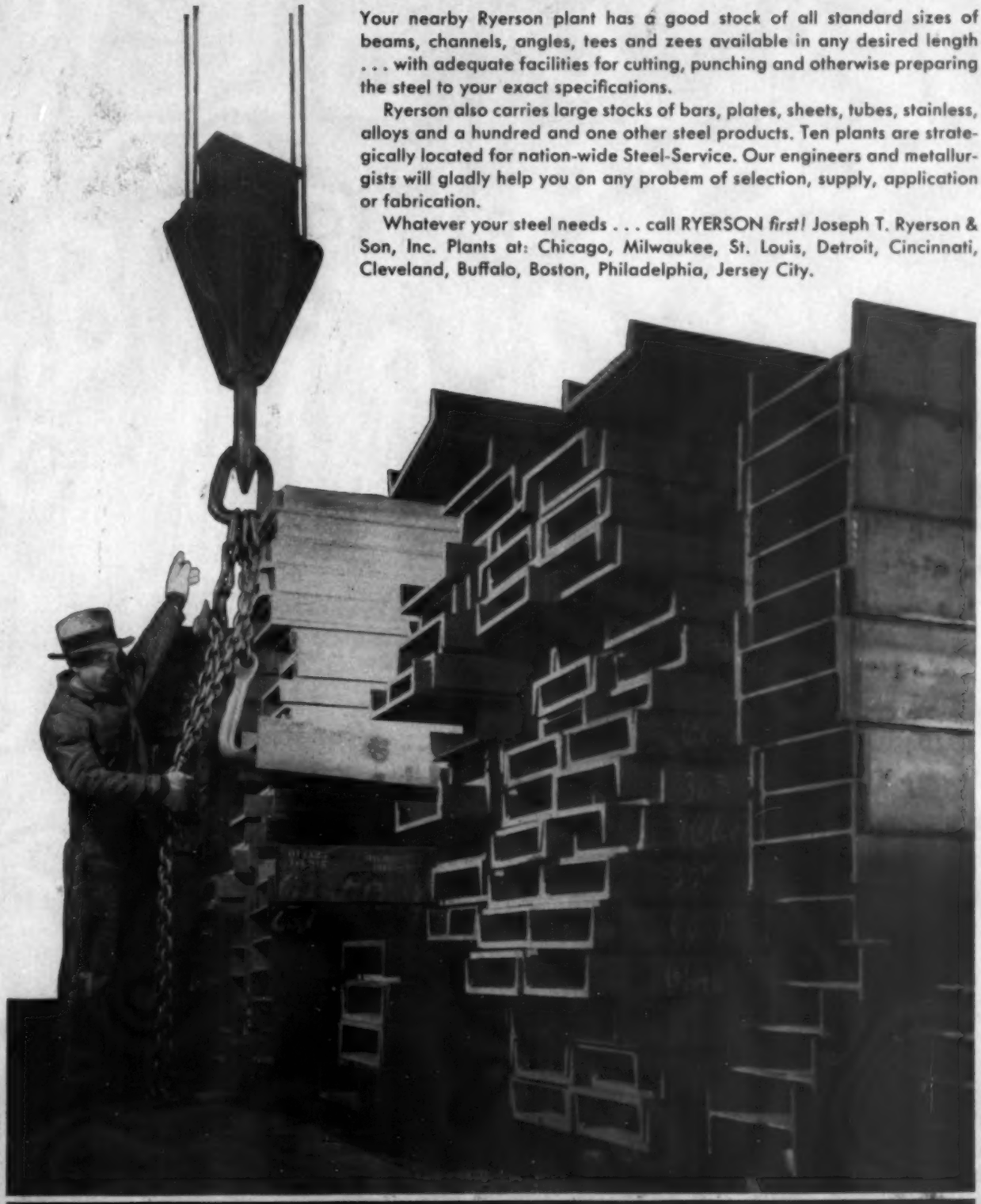

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MOTOR FREIGHT FALTERS

Increasing difficulty encountered in keeping war materials moving as replacement parts and labor become more scarce. Production so far only slightly affected

Shortages of replacement parts and skilled service labor pose a difficult problem for freight truck fleet operators

STEEL and other vital war material deliveries are menaced by faltering city and highway truck transportation.

Lack of new equipment and urgently needed replacement parts, shortage of maintenance and service labor, and restrictive government regulations are a combination of factors working toward a breakdown in vital shipping services at many points.

Curtailed gasoline supplies and tire conservation are additional factors contributing to motor freight haulers' difficulties, tending to slow down the movement of finished goods and raw materials.

The situation applies not only with respect to commercial truckers but with manufacturers and others who operate their own trucks as well.

Serious interference with war production due to raw material delivery failures so far has been averted. By ingenious adaptation of equipment and parts, and resort to service innovations in the direction of utmost utilization of existing equipment, truck operators have been able to carry on in the face of mounting difficulties.

Indicative of commercial truckers' success in overcoming their difficulties is the fact that motor freight volume in March this year was 21 per cent in excess of that in the like month of 1942. This betterment was a continuation of the record performance last year when 10 per cent more freight was hauled over the nation's highways than ever before.

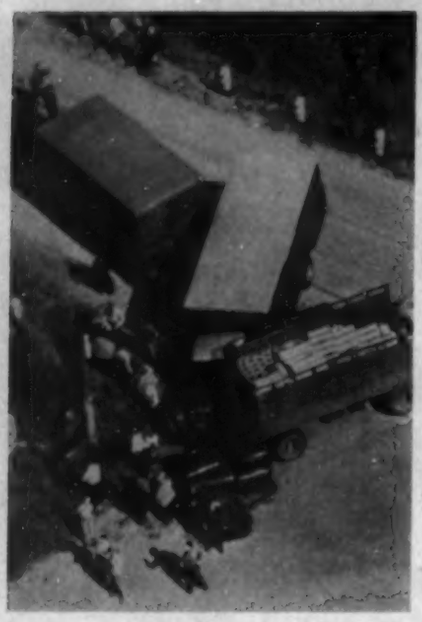
But truck wheels are beginning to turn less rapidly. Wear and tear is taking toll of equipment and scarcity of replacement parts and competent garage labor makes it difficult to maintain trucks in topnotch condition. Trucks are being overused, and the pressure for war goods deliveries gives operators little time in which to completely rehabilitate equipment. Consequently fears are rising that the magnificent performance of past months cannot be maintained unless relief from existing difficulties is soon afforded.

Prospects Are Brighter

Fortunately, government authorities, cognizant of the seriousness of the situation, are moving to remedy conditions. During third quarter 7300 heavy-duty trucks and 9200 trailers will be manufactured under War Production Board orders. Repair parts also will be made available in more plentiful supply. Additional allocation of materials for automotive replacement parts for second quarter is expected to meet the trucking industry's request almost 100 per cent. Eighty-five per cent of the alloy steel requested for this quarter has been allocated and the industry received the full requested amount of carbon steel. Copper wire allocation to the industry was 90 per cent of the amount sought.

As a general thing truckers place lack of manpower and shortage of equipment as their No. 1 and No. 2 headaches. These are closely followed by finances, and confusion in the application of government regulations. Gasoline restrictions are an increasingly troublesome factor in some important war production centers, chiefly the East.

City deliveries have been drastically curtailed under gas and tire conservation regulations, but on the whole services at most points are maintained at sufficiently high level to meet minimum requirements of community life. But with trucks steadily deteriorating and not being replaced a threatening de-



A wreck like this, all too frequent among heavy freight transports, means new materials must be obtained before the vehicles can resume hauling of war materials

livery situation is seen looming on the horizon.

Conditions vary between war production centers as indicated by reports from STEEL's district representatives. The overall situation, however, follows a general pattern and it is evident that with the nation's trucks wearing out a gradual slowing down of city and highway transport is inevitable.

EASTERN AREA:—Deliveries of steel from warehouse are threatened by truck maintenance problems which in this territory are enhanced by sharply restricted gasoline supplies. Thus far deliveries have not suffered serious delays, but doubling of orders for shipment to the same district is frequent to eliminate extra haulage, while for small lots, buyers are coming to the warehouses for steel in greater numbers.

Importance of steel deliveries in the war production program has given priority as to tires and generally for gasoline within limits. The mileage ration of gasoline for trucks has been cut 40 per cent through an extension of the valid period from June 30 to July 25 for all current "T" allowances. Retail and wholesale deliveries of many classes of products have been greatly curtailed or eliminated entirely, and in the case of trucks hauling steel, semifinished parts and raw materials, fuel will be spread thinner than before, which for most shippers has already been restricted to a low point.

In the New York metropolitan area and other large city districts much steel is hauled by contract truckers. One of the largest operates a fleet of 1600 trucks, several hundred at times engaged in moving steel. Replacements in normal years total 350 to 400 trucks; the normal life of a truck with this company is five years. With few trucks available after 1942, replacements are nil and fleets are deteriorating for lack of new units and parts.

PITTSBURGH AREA:—Industrial concerns, by and large, have been able to maintain and operate their own trucks with a minimum of difficulty. They have been able to get new trucks and repair parts much more easily than commercial trucking firms. Also, they have been in more favorable position as regards manpower. By utilizing commercial trucks for the longer hauls manufacturers have been able to save their own equipment for internal hauls and relatively short trips.

Increased load on the commercial truckers must be carried on equipment which cannot be taken out of service for proper maintenance, and when equipment is serviced lack of skilled mechanics makes for unsatisfactory servicing. Skilled truck drivers also are scarce and this leads to additional truck upkeep problems since green drivers are not capable of making minor repairs.

Replacement parts are scarce and numerous trucks are tied up awaiting repairs. The fuel problem is growing in importance, and shippers in the eastern area expect an acute shortage of railroad cars to develop unless gasoline supply for commercial vehicles is enlarged, as a considerable part of the normal truck load is being diverted to the railroads. It is estimated the heavy load now carried by the trucks will be cut an average of 35 per cent. The tire problem also is cause for concern.

CHICAGO AREA: — A commercial trucking line in this district has been able to maintain operations to date but the future is unpredictable, it reports. Truck breakdowns formerly averaged one per 1000 miles. Now the figure is closer to two. Lack of mechanics and lack of equipment and parts are chief difficulties. For repair parts this trucker frequently is obliged to use substitutes or secondhand parts.

A midwestern supplier of cold-finished steel handles its shipments through commercial truck lines and finds it is getting only about 25 per cent of customary service. There are not enough low-side, open-top, or flat trucks available for hauling steel. The company is forced to lean more heavily on rail shipment and since most of its freight is less carload shipments, it may be held up two or three days while full carloads are assembled.

Small plants requiring steel frequently do not have their own sidings and shipments must be picked up at freight terminals by trucks. Consumers often are obliged to shut down machines if they run out of steel and additional supplies are not speedily obtained.

YOUNGSTOWN AREA: — Some im-

This boom truck was constructed from scrap materials. Only new parts are two pulleys, indicating the ingenuity fleet operators must exercise to "keep 'em rolling." NEA photos

portant war production in this district is being threatened by lack of new trucks and inability of truck operators to obtain replacement parts. Scores of trucks, both those of manufacturers and commercial haulers, have been tied up within the past six months due to inability to obtain important functional parts. But the situation in parts today is better than it was in March and February. One trucker here comments: "The situation now isn't nearly as bad as it is likely to get before the war is over."

Much of the trucking here is done by contract haulers and many of these interests report reductions in their fleets. One big truck line which hauls considerable steel reports its fleet reduced from about 140 trucks a year ago to about 40 at present. It has closed down some of its branch offices. So far none of the industries in this area has lost any production due to the lack of truck parts.

CLEVELAND AREA:—Manufacturing interests in this area state deliveries have been slowed down somewhat due to inability of truckers to maintain service as formerly. The situation is not yet acute but shows signs of becoming worse, due to heavy use of trucks and inability to get prompt deliveries on some essential replacement parts. Parts on which deliveries are extended include rear axles, gears, front end and steering parts, crankshafts, brake parts and carburetors.

DETROIT AREA: — Generally, the trucking situation here is as yet not critical. Repair parts are tight, but the Automotive Division of WPB has made a more liberal release of materials for parts in second quarter. This, however, will not be reflected in any increase in parts supply until probably the third or fourth quarter.

This stepup in materials was made largely because of the fear of a Senate investigation resulting from findings of the Truman committee, it is believed in some quarters. Some western senators recently declared truck operators in the West were facing a critical situation because of lack of parts for repair work, and the Truman committee began investigating the charges.

Tightness in repair parts seems to affect commercial haulers more than fleet owners.

Transmissions and axles have been the most difficult repair items to obtain, but at the moment they are not in as tight supply as they were several months ago.

BUFFALO AREA: — Leading motor-freight companies using Buffalo as a terminal for deliveries east and west, report the cut in truck and trailer manufacture, and lack of repair parts have curtailed their business at least 10 per cent. They state about 90 per cent of their total load is for the war effort. One large operator says about 10 per cent of his equipment is laid up due to lack of repair parts. Moderate improvement has been noted in parts deliveries recently.

CINCINNATI AREA:—More liberal supply of trucks, trailers and repair parts is needed here to facilitate the even flow of manufactured goods. The situation is seriously affecting a few fabricators, but in the main the situation is not critical. Survey discloses many manufacturers have shifted to use of the railroads where this is possible. Real trouble is appearing in the heaviest type of trucks.

BIRMINGHAM AREA:—Many essential manufacturers are seriously handicapped by inability to purchase new trucks. An even more serious problem is the scarcity of truck repair parts. One large interest reports deliveries delayed as much as a week in many instances since trucks often are idle while a search for parts is made. Shortage of garage mechanics is becoming increasingly serious.

Present, Past and Pending

■ FORD BOOKS NEW GLIDER CONTRACT

DETROIT—Ford Motor Co. announces receipt of additional contract involving $31,000,000 for gliders for the Army Air Force. Contract is estimated to call for 6000 gliders.

* * *

■ FARM MACHINERY PROGRAM INCREASED

WASHINGTON—Substantially increased farm machinery program gets under way July 1. Total of 300,000 tons of carbon steel is allocated manufacturers for third quarter and advance authorization of 200,000 tons have been approved for three quarters, Oct. 1, 1943 to July 1, 1944. New farm machinery order will be issued replacing L-170.

* * *

■ MOVES TO STEP UP ORE MOVEMENT

WASHINGTON—With movement of iron ore in the Great Lakes lagging behind schedule, the Office of Defense Transportation has broadened its permit system to cover virtually every commercial vessel afloat on the lakes to help the carriers meet the 1943 ore shipment goal. Up to June 3 the lake ore movement totaled only 12,550,836 gross tons against 20,839,647 up to the same date in 1942.

* * *

■ ASKS CONGRESS TO INVESTIGATE SCRAP

WASHINGTON—Charging the War Production Board is gambling with vital scrap supply, Congressman Cecil R. King of California has demanded a legislative investigation of the entire scrap program. He challenges reliability of WPB figures, which, he says, indicate that while 5,000,000 tons more of steel are expected this year than last, 2,500,000 tons less of scrap for melting are provided for in WPB plans.

* * *

■ GALVANIZED SHEET PRICE RISE EXPECTED

WASHINGTON—Upward price revision of prime galvanized sheets shipped from warehouses in five Midwestern cities will be established by OPA in amendment No. 16 to price schedule No. 49, which it is reported, will be published this week to become effective June 21.

* * *

■ FILE PRICE ON ELECTROLYTIC TIN PLATE

WASHINGTON—New base price of $4.75 per base box has been filed with OPA on three-quarter pound electrolytic tin plate by one or two producers. Tin plate quotas are reported likely to be boosted since control over containers has been virtually taken out of the hands of WPB and turned over to the Food Administration.

* * *

■ NEW WIRE MILL IS INSPECTED

WORCESTER, MASS.—Top officials of the United States Steel Corp. inspected the new wire mill at South works of the American Steel & Wire Co., June 9 and 10. Central works has been sold and North works will be abandoned after the war. New mill is designed for wide range specialties, also cable.

Antistrike Bill Gains Favor; Conferees Agree on Provisions

Eleven million tons of coal lost in second stoppage. Miners likely to obtain substantial increase in compromise on portal-to-portal pay. Coke costs to be increased 40 to 50 cents a ton

ANTISTRIKE legislation, often proposed in Congress but always blocked by administration leaders, now appears likely of passage, under the spur of the two recent stoppages in the soft coal mines and hundreds of "wildcat" strikes in other war industries.

Agreement on the Smith-Connally bill —now referred to in Washington as the Lewis Antistrike bill—was announced last week by Senate and House conferees. The original bill was passed by the Senate several weeks ago. The House attached more drastic provisions and passed the amended bill.

Meanwhile, measures to regulate labor unions have been proposed in many of the state legislatures and laws of varying severity adopted in nine.

Advocates of the Smith-Connally bill expressed hope that both houses will vote upon it before the current coal truce expires June 20.

Fines, Imprisonment for Violators

As agreed upon by the conferees, the measure would prohibit strikes in any plant seized by the government, and provide fines of $5000 and a year in prison for violators. Although the President already has seized war plants under his general wartime powers, the bill formally delegates him this authority.

Other provisions include:

1. Formal legal power for the War Labor Board, authorizing it to step into any wartime labor dispute of its own volition and to enforce its decisions through court orders.

2. Ban on unions making contributions to political campaign funds, such as the $500,000 "loan" by the United Mine Workers to the 1936 Democratic fund.

3. Withdrawal by government from seized plant within 60 days after efficient operations had been restored.

4. Prohibition on the WLB authorizing closed shop or maintenance of membership contracts.

Labor unions are vigorously opposing the bill. If passed by Congress, it will place the President in a dilemma. Failure to sign the bill would be interpreted as encouraging stoppage in vital war industries, while approval of the act would bring protests from labor, upon which the administration has leaned so heavily for votes.

While Congress was deliberating on the antistrike bill, some progress was being made toward a settlement of the coal dispute, with a compromise on the portal-to-portal pay issue likely. This would give the miners a substantial wage increase and probably would receive the approval of the WLB. At week's end, $1.30 a day average increase for time spent in traveling from the mine entrance to the working face appeared probable. This with other adjustments ordered by the WLB, including increased vacation pay and the supplying by operators of certain equipment formerly supplied by the miners, would bring the total increase to about $1.50 a day.

Average output per miner is five tons of coal daily. The increase thus would add 30 cents a ton to the cost of mining coal.

Effect on the steel industry, already pinched between frozen prices and increased costs would be severe, as it would add between 40 and 50 cents a ton to the cost of coke, of which the industry uses more than 50,000,000 tons annually.

Eleven million tons of coal were lost by the recent 5-day strike. At least 13 blast furnaces were taken off for lack of coke. At Pittsburgh the steelmaking rate dropped 8½ points due to lack of coke oven gas for the open hearths.

Nine States Approve Union Restrictions

Nine states have adopted laws placing restrictions on labor union activities. Nine others have rejected proposed bills, while measures are pending in others. Most of the regulatory laws were passed in the less highly industrialized states.

Colorado passed a law requiring all unions to incorporate, placing all unions under the jurisdiction of the state industrial commission. Sitdown strikes and secondary boycotts are defined as unfair practices. The closed shop is also prohibited. Secret ballot is the method for determining employe representatives and policies.

Three amendments were added to the Pennsylvania labor relations act. The new law forbids unions to deny membership because of political affiliation but provides that certification may be held up by appealing to the courts. Pennsylvania also banned political contributions by unions or other unincorporated groups, but an effort to empower the state to regulate labor organizations was killed in the committee.

Minnesota passed several amendments to its labor relations act. Strikes and picketing in jurisdictional disputes are forbidden after such disputes have been submitted to a referee. Conduct of unions is regulated and the period of time in which a temporary injunction in a labor dispute may remain in effect has been modified.

A measure approved in Idaho is similar in many respects to one passed in South Dakota earlier. The Idaho measure requires filing of financial and other information by labor unions. Picketing and boycotting of agricultural premises are prohibited. South Dakota law requires filing of financial statements and bans labor organizers from farms.

The Texas law requires financial statements and registration of organizers; regular annual elections; filing of collective bargaining contracts; court review of union expulsions, and bans political contributions. Legislation approved by Arkansas conforms to the anti-violence type for it prohibits picketing.

Kansas ordered licensing of union agents and accountings of the fiscal affairs and salaries of labor organizations and forbade sitdown strikes and jurisdictional disputes.

In Michigan molesting a truck bearing agricultural or commercial goods was made a felony.

Ickes Asks Republic To Build Up Stocks

Replying to a directive by Harold L. Ickes, solid fuels co-ordinator, that Republic Steel Corp. operate its Alabama mines on a 6-day week until 60 days' supply of coal was built up, C. M. White, vice president in charge of operations for Republic, stated:

"In our Alabama mines this year we have had 11 separate work stoppages accounting for a loss of approximately 62,000 tons of coal. Additional losses by absenteeism running as high as 10 per cent cannot be measured. Had we not lost this large tonnage, there would have been no necessity for a 6-day operation."

Mr. White said the southern mines would continue to operate on a 6-day week and that Republic would continue to buy all suitable coke offered on the open market to insure continuous operations of iron and steelmaking facilities.

Steel Industry's Consumption Huge

Data for 1942 show nearly four tons of supplies required to produce one ton of finished product . . . Over three-quarters of total charged into blast furnaces

MORE than 243,640,000 tons of raw materials were consumed in American blast furnaces and steelmaking furnaces during 1942, exclusive of ferroalloys and alloying elements, according to the American Iron and Steel Institute.

Production of finished rolled products amounted to about 62,446,000 tons, indicating the industry consumed nearly four tons of raw materials for each ton of finished product produced.

In certain products using relatively large amounts of alloying elements and where loss of metal during manufacture runs high, as much as 5½ tons of raw materials were consumed for each ton of finished product obtained.

Over three-quarters of the total tonnage of materials consumed were charged into blast furnaces. Most of the pig iron, in turn, was utilized in the industry's steel furnaces.

In the production last year of 59,076,000 tons of pig iron, 188,615,000 tons of raw materials were consumed. Almost 103,640,000 tons of ore were used, nearly 52,822,000 tons of coke, and 22,857,000 tons of limestone.

In addition, about 1,994,000 tons of scrap were charged into the blast furnaces, together with around 7,302,000 tons of cinder and mill scale.

About 50,533,000 tons, or over 85 per cent, of the pig iron produced last year was charged into steel furnaces. Substantially all of the remaining pig iron was used by foundries.

Besides pig iron, almost 55,025,000 tons of steelmaking materials (excluding alloys) were consumed by the steel industry last year. No estimate is available of the consumption of alloying elements.

Nearly 41,819,000 tons of scrap iron and steel were charged into steel furnaces, along with approximately 5,400,000 tons of iron ore and 6,900,000 tons of fluxes. In addition, 906,000 tons of iron in the form of cinder, mill scale and sinter were used.

Open Hearths Use 85,792,000 Tons

Open-hearth furnaces consumed over 85,792,000 tons of metallic raw materials other than ferroalloys. Approximately 52 per cent of that total consisted of pig iron, about 44 per cent was scrap, and the balance consisted of the metallic weight of the ore, cinder and scale consumed last year.

More than 6,440,000 tons of raw materials, of which over 95 per cent was pig iron, went into the steel industry's bessemer converters. Scrap represented the balance of the materials consumed in the bessemer process throughout the year.

Electric furnaces consumed about 3,721,000 tons of metallic raw materials, not including what must have been a substantial tonnage of metal in the form of the ferroalloys used in the manufacture of alloy steels. Almost 97 per cent of the total electric furnace charges consisted of scrap, about one per cent was pig iron, and the remainder represented the amount of metal contained in the ore, cinder and scale consumed.

Batt Attributes Plant Closings To Huge Output

ABANDONMENT of some war projects was attributed jointly to the fantastic volume records registered by American builders of armaments and the necessity of flexibility to meet overnight changes in the needs of global war, by William L. Batt, vice chairman of the War Production Board, in a radio address last week.

Mr. Batt said that in some cases "not only did we gear our war machine to a pitch much higher than Hitler feared—we did better than even we thought we could."

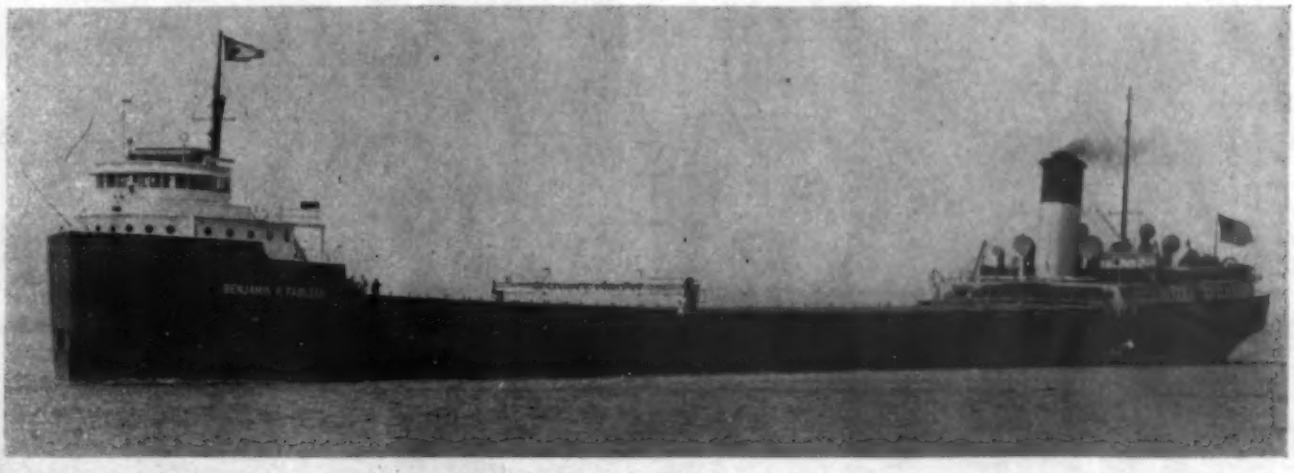
A need that existed six months ago may be out the window now, he observed.

Asked about the shutting down of a big tank plant when its tank contracts were canceled, Mr. Batt said:

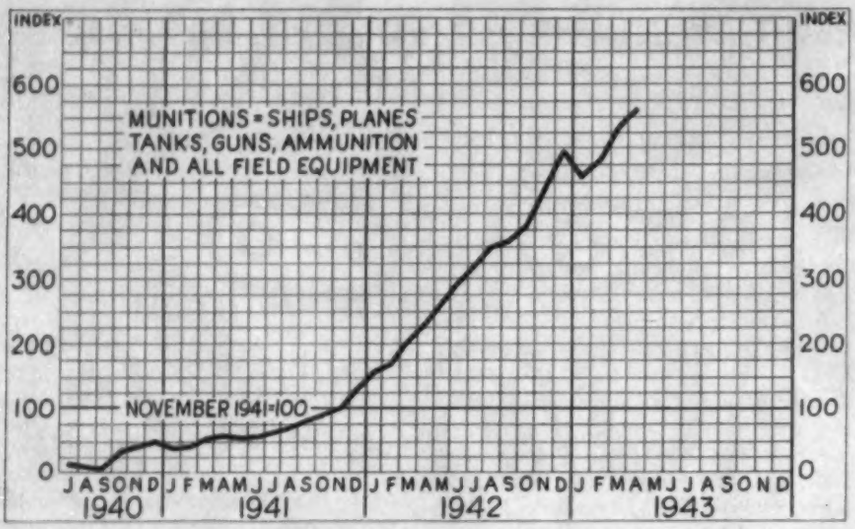
"In the first place, it's located in a pretty 'tight' labor market. The workers had little trouble finding new jobs. In fact nearby employers put in bids for

(*Please turn to Page* 149)

IRON ORE CARRIER BREAKS OWN RECORD HAULING 17,401 TONS



AFTER establishing an ore cargo record by delivering 17,101 tons of the mineral at Cleveland, June 4, the BENJAMIN F. FAIRLESS, one of the five largest carriers on the lake, broke its own mark last week by carrying 17,401 tons to Conneaut, O. THE FAIRLESS, a 640-foot vessel, is owned and operated by Pittsburgh Steamship Co., United States Steel Corp. subsidiary. Other carriers are expected to establish new records when the MacArthur deepwater lock is completed, permitting heavier loading. NEA photo.


INDEX
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MUNITIONS = SHIPS, PLANES TANKS, GUNS, AMMUNITION AND ALL FIELD EQUIPMENT
NOVEMBER 1941=100
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1940
1941
1942
1943

Munitions Output Up

Gains 7 per cent in April. Aircraft records greatest dollar volume increase. Better balance attained

MUNITIONS production in April reached an all-time record and advanced 7 per cent over March, the previous peak, according to WPB Chairman Donald M. Nelson. The WPB production index advanced to 567, based on November, 1941, as 100.

Better balance was attained in April than in any month since Pearl Harbor. Some items still were produced in excess of expectations, while others lagged badly.

Total munitions output for the month closely approached the $5,000,000,000 mark.

The aircraft program, largest of all and calling for the most rapid progress, showed the largest dollar volume gain, but did not reach the April objective. The month's output totaled $1,649,000,000, or 33 per cent of all munitions produced.

Aerial Bomb Output Climbs

Aircraft ordnance production also advanced rapidly, gaining 14 per cent over March due largely to increase in manufacture of heavy aerial bombs.

Ground signal equipment rose 22 per cent.

A great spurt was made in production of ammunition for the "bazooka" antitank guns, which reached the mass production stage earlier than expected.

Construction of Navy vessels, ordnance and equipment increased 3 per cent in actual value during April, although tonnage dropped from 186,000 to 157,000 displacement tons. Delivery of major combat vessels dropped proportionately while minor combat vessels increased 83 per cent. This indicates the emphasis on antisubmarine warfare.

Merchant vessel production increased 13 per cent, excluding maintenance; including maintenance, the gain was 11 per cent. Deliveries of finished ships totaled 149 vessels of 1,600,000 deadweight tons.

Production of miscellaneous munitions rose 11 per cent. Automotive vehicles and equipment was up 9 per cent. An assortment of other miscellaneous items increased 22 per cent while clothing and personnel items declined 9 per cent.

May Plate Output Holds at High Level

Steel plate production in May was maintained at about recent levels, according to the Steel Division, WPB. Shipments totaled 1,114,920 net tons, compared with 1,121,647 tons in April and 1,012,194 tons in May, 1942. The record for shipments in any month was set in March, when 1,167,679 tons were shipped.

Included in May shipments were 535,528 tons produced on continuous strip mills which have been converted to roll plates. Strip mill shipments in April were 535,548 tons and in May, 1942, they were 425,211 tons.

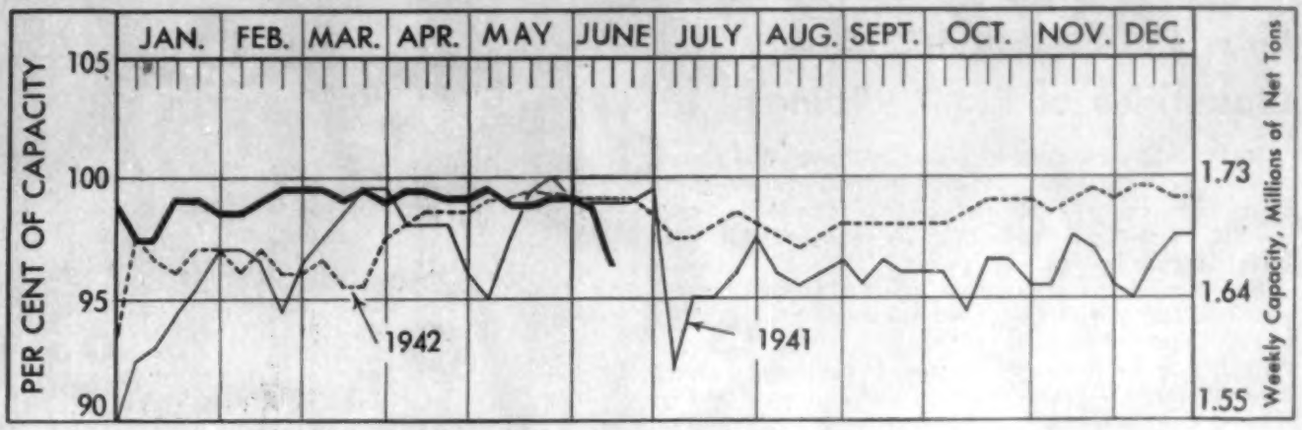
WPB announcement states plate shipments in May were in strict conformity with production directives and that shipments were in good balance with plate requirements of the claimant agencies.

STEEL INGOT STATISTICS

	Estimated Production—All Companies								Calculated weekly production, all companies	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	
Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production										
1943										
Jan.	6,576,589	97.8	478,058	85.9	369,395	95.4	7,424,042	96.8	1,675,856	4.43
Feb.	6,033,674	99.3	447,843	89.1	344,532	98.6	6,826,049	98.5	1,706,512	4.00
March	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
1st qtr	19,395,558	99.3	1,429,574	88.4	1,095,146	97.5	21,920,278	98.4	1,704,532	12.86
April	6,509,812	99.9	481,810	89.4	382,532	102.1	7,374,154	99.3	1,718,917	4.29
May	6,664,298	99.1	483,024	86.8	398,057	102.9	7,545,379	98.4	1,703,246	4.43
Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production										
1942										
Jan.	6,322,215	95.3	490,874	86.0	299,017	94.2	7,112,106	94.5	1,605,442	4.43
Feb.	5,785,918	96.6	453,549	88.0	273,068	95.2	6,512,535	95.9	1,628,134	4.00
March	6,572,930	99.0	493,191	86.4	325,990	102.7	7,392,111	98.2	1,668,648	4.43
1st qtr	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96.2	1,634,273	12.86
April	6,345,133	98.7	454,834	82.2	321,334	104.5	7,121,291	97.7	1,659,975	4.29
May	6,595,440	99.4	433,938	79.5	333,200	104.9	7,382,578	98.1	1,666,496	4.43
June	6,239,674	97.1	452,528	81.8	323,100	105.1	7,015,302	96.3	1,635,269	4.29
2nd qtr	19,180,247	98.4	1,361,300	81.2	977,624	104.8	21,519,171	97.4	1,654,049	13.01
1st hlf	37,861,310	97.7	2,798,914	83.9	1,875,699	101.1	42,535,923	96.8	1,644,218	25.87
July	6,345,315	95.7	453,686	79.6	345,957	96.6	7,144,958	94.5	1,616,506	4.42
Aug.	6,414,637	96.5	467,293	81.8	345,725	96.3	7,227,655	95.4	1,631,525	4.43
Sept.	6,286,855	97.9	437,961	79.4	332,703	95.9	7,057,519	96.4	1,648,953	4.28
3rd qtr	19,046,807	96.7	1,358,940	80.3	1,024,385	96.3	21,430,132	95.4	1,632,150	13.13
9 mos.	56,908,117	97.3	4,157,854	82.7	2,900,084	99.4	63,966,055	96.3	1,640,155	39.00
Oct.	6,750,829	101.5	461,897	80.9	366,788	102.2	7,579,514	100.0	1,710,951	4.43
Nov.	6,371,750	99.0	458,469	82.9	349,593	100.5	7,179,812	97.8	1,673,616	4.29
Dec.	6,471,261	97.6	475,204	83.4	358,075	100.0	7,304,540	96.6	1,632,611	4.42
4th qtr	19,593,840	99.4	1,395,570	82.4	1,074,456	100.9	22,063,866	98.2	1,679,137	13.14
2nd hlf	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96.8	1,655,653	26.27
Total	76,501,957	97.9	5,353,424	82.6	3,974,540	99.8	86,029,921	96.8	1,649,979	52.14

The percentages of capacity operated in the first 6 months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

The percentages of capacity operated in 1943 are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545	....	....	....	....	....	....	....
1942	7,112	6,512	7,392	7,122	7,382	7,022	7,148	7,233	7,067	7,584	7,184	7,003
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	5,035	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

May Ingots Gain

Institute reports production third highest in history at 7,545,379 tons

STEEL ingot and castings production in May was 7,545,379 net tons, according to American Iron and Steel Institute, a new high for May and third largest in the history of the industry. This compared with 7,374,154 tons in April, an increase resulting from one more working day. It was substantially greater than 7,382,578 tons produced in May, 1942, but failed to equal the all-time high of 7,670,187 tons in March this year.

During the first five months this year, output aggregated 36,839,811 tons, compared with 35,520,621 in the corresponding period last year.

During May the industry operated at an average of 98.4 per cent of capacity, against 99.3 per cent in April and 98.1 per cent in May, 1942. In the record month of March, 1943, production was at 100 per cent.

Electric steel production established an all-time record in May for the third consecutive month, output being 398,057 tons, compared with 382,532 tons in April, at 102.9 per cent of rated capacity.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 12	Change	Same Week 1942	Same Week 1941
Pittsburgh	90	—8.5	95.5	100.5
Chicago	97	None	104	102
Eastern Pa.	95	None	96	97
Youngstown	97	None	95	98
Wheeling	86	—8	78	88
Cleveland	95	—0.5	94	92
Buffalo	90.5	None	90.5	90.5
Birmingham	95	—5	95	95
New England	95	None	95	94
Cincinnati	88	—6	95	89
St. Louis	93	+1.5	95.5	98
Detroit	83	+3	86	92
Average	96.5	—2	*99	*99

*Computed on bases of steelmaking capacity as of these dates.

Steel Rate 96½%

Furnace operations are cut by mine strike, limiting coke and gas supply

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week receded 2 points to 96½ per cent, a result of the coal mining interruption which cut operations in the Pittsburgh area sharply. Two districts made small gains, five declined and five were unchanged.

The Pittsburgh loss cut its production to 90 per cent of capacity, lowest since the final week of 1941. This resulted mainly from lack of coke-oven gas to heat open-hearth furnaces. Wheeling dropped 8 points for the same reason.

Steel Corp. Shipments Show Increase in May

Shipments of finished steel products by the United States Steel Corp. in May totaled 1,706,543 net tons, an increase of 75,715 tons over April shipments of 1,630,828 tons and a decrease of 127,584 tons from the 1,834,127 tons shipped in May, 1942.

For five months this year total movement was 8,487,353 tons, against 8,729,439 tons in the corresponding period last year.

(Inter-company shipments not included)

Net Tons

	1943	1942	1941	1940
Jan.	1,685,992	1,738,893	1,682,454	1,145,592
Feb.	1,691,592	1,616,587	1,548,451	1,009,256
Mar.	1,772,397	1,780,938	1,720,366	931,905
Apr.	1,630,828	1,758,894	1,687,674	907,904
May	1,706,543	1,834,127	1,745,295	1,084,057
June	....	1,774,068	1,668,637	1,209,684
July	....	1,765,749	1,686,667	1,296,887
Aug.	....	1,788,650	1,753,665	1,455,604
Sept.	....	1,703,570	1,664,227	1,392,838
Oct.	....	1,787,501	1,851,279	1,572,408
Nov.	....	1,605,545	1,624,186	1,425,352
Dec.	....	1,849,635	1,846,036	1,544,623
Total	....	21,064,157	20,458,937	14,976,110
Adjustment	....	....	*42,333	†37,639
Total	....	....	20,416,604	15,013,749

†Increase. *Decrease.

Welding Wire Output Nearly Doubled in 1942

Production of steel welding wire in 1942 was approximately 800,400,000 pounds, almost double record output of 453,120,000 pounds in 1941, the American Iron and Steel Institute reports. The 1942 output was more than three times that made in 1940 and indicates increasing demand for ships, planes, tanks and other welded products.

For each ton of finished steel made in 1942 almost 13 pounds of welding wire were made, compared with over seven pounds in 1941 and five pounds in 1940. In 1938, the year before the outbreak of the war in Europe, about 4.9 pounds of welding wire were made for every ton of finished steel.

New Plants Require Large Quantities of Plate, Piping

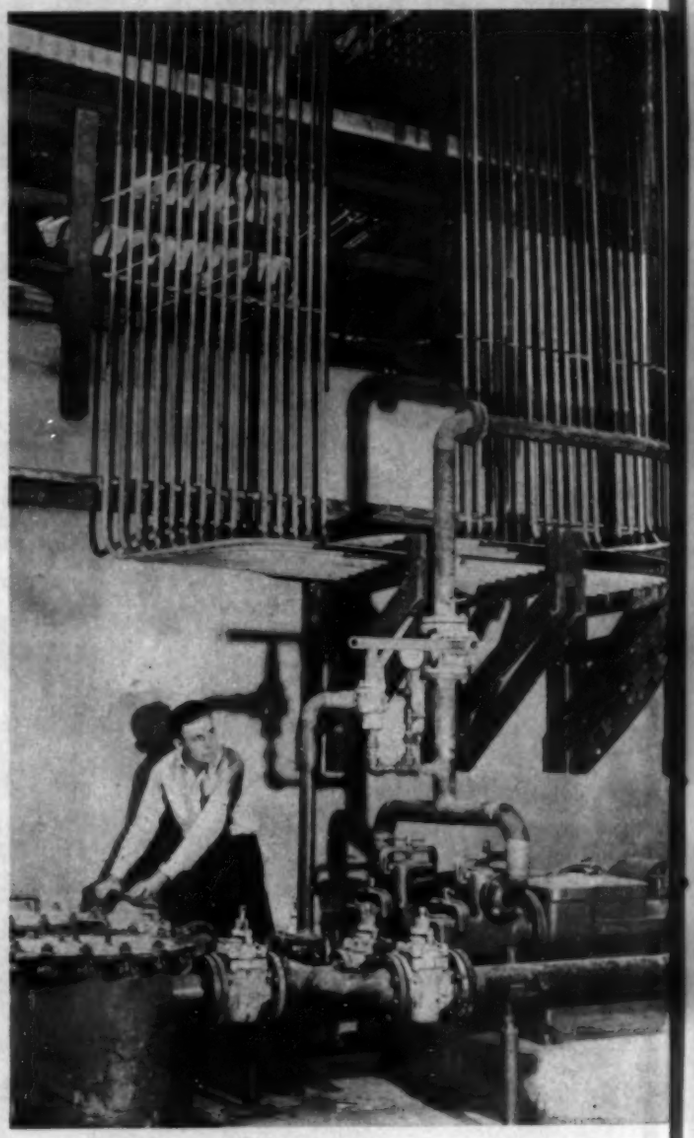
AN INKLING as to the quantities of heavy-gage steel plate, piping, flanges and welded construction going into the new government-owned synthetic rubber plants is given by these views of a Buna-S plant at Institute, W. Va., operated by the United States Rubber Co.

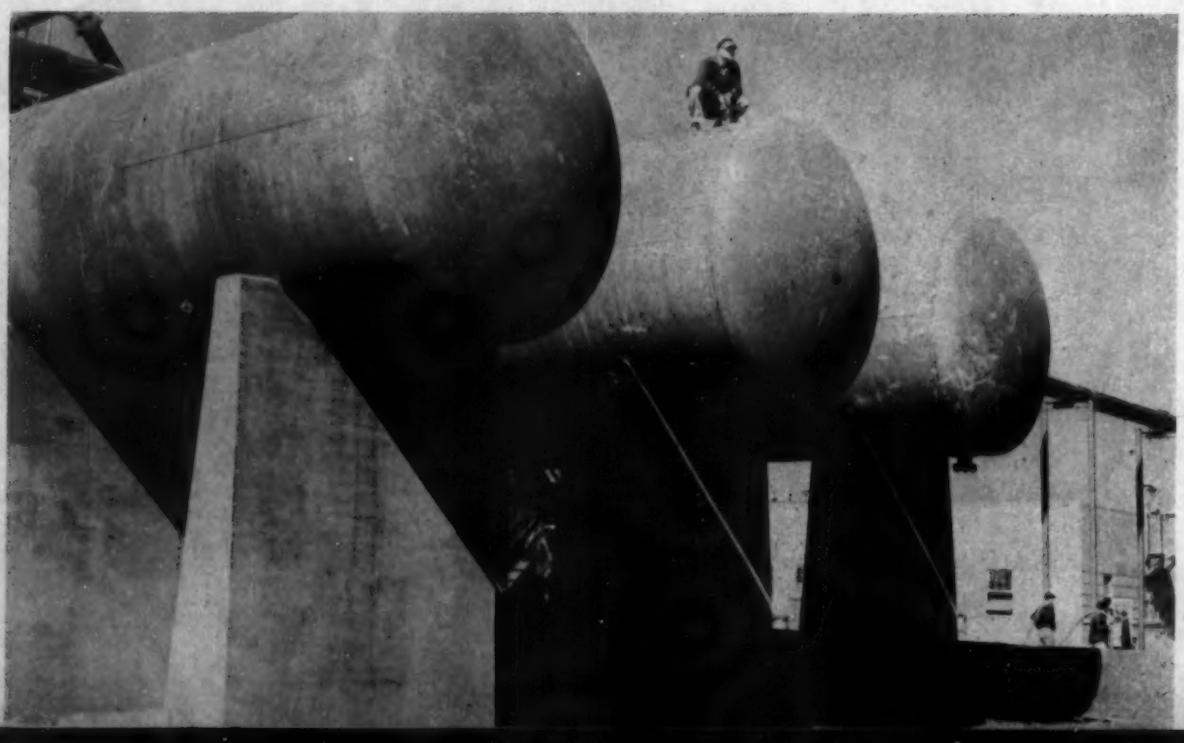
The entire government program is estimated to require nearly 150,000 tons of carbon, alloy and cast steel, as well as 2500 tons of copper and brass.

At right is shown some of the maze of piping required to transport successive batches of synthetic rubber latex to twelve 30,000-gallon storage tanks for blending to assure uniformity. The blended latex then is pumped to other tanks where the rubber is coagulated in flocs and crumbs.

Below at left is shown the top of a "blowdown" tank into which a batch of polymerized butadiene and styrene flows under pressure after polymerization in glass-lined steel reactor vessels. Polymerization is arrested in the blowdown tanks.

At bottom are three of nine 30,000-gallon butadiene storage tanks. Compare their size with that of man atop center tank. The nine tanks hold enough butadiene for three days' operations at the Institute plant, or the equivalent for enough rubber for 190,000 passenger car tires.





Preference Rating System for Steel Products To Be Eliminated July 1

PREFERENCE rating system as such for deliveries of steel is eliminated by terms of an amendment to order M-21, effective July 1 when the Controlled Materials Plan goes into full operation.

At present and until July 1 steel deliveries are permitted on a preference rating of A-10 or higher.

Under the amended order, steel products may be delivered only on authorized controlled material orders; as permitted by priorities regulation No. 13; by CMP regulation No. 4 (sales of controlled materials by warehouses and distributors); by Orders M-21-b-1 and M-21-b-2 (distributors); or as specifically directed by WPB.

This applies to all steel products, except iron products and steel forgings which are not included as steel products in CMP regulation definitions. Iron products and steel forgings may still be delivered on an A-10 or higher rating; as permitted by priorities regulation No. 13; and on orders authorized by WPB.

The amended M-21 order also makes it clear that second quality material and shearing of all types are subject to the same control as prime material. In this connection, interpretation No. 1 of M-21 as amended points out that the terms "steel" and "iron products" do not include used material or steel which has been recovered or salvaged from used material.

For example, shearings generated by a steel mill or croppings generated at a shipyard are covered by the order. If sold as scrap at OPA ceiling prices, however, such material may be disposed of free of restrictions of the order. Restrictions also do not cover used material such as line pipe which has been in use by an oil company for a period of time, or structural steel salvaged from a demolished building.

System of Identifying WPB Forms Being Simplified

A simplified system of identifying War Production Board forms is being put into effect as present stocks are exhausted. All forms in the WPB, PD, UF and RD series eventually will bear only the initials WPB, followed by new serial numbers.

All authorization, allocation and other form stationery used by industry divisions and field offices will carry the prefix GA (General Administrative), provided it does not seek information from industry.

CMP and CMPL forms will continue to be identified as formerly.

Restricts Sales of Steel Listed with Recovery Corp.

Sales of steel listed with Steel Recovery Corp. are prohibited except on authorizations issued by the War Production Board. This action was taken last week by an amendment to Priorities Regulation No. 13. Authorizations may be obtained either from WPB regional offices or from the WPB representatives at Steel Recovery Corp. and may be used without requiring the purchaser to count the steel bought against his CMP allotment.

Wire Mills Permitted More Latitude in Bookings

Wire mills may accept orders for wire mill products which they do not produce, if they are able to have the required item produced by another mill, War Production Board says. Original Direction No. 9 to CMP regulation No. 1 did not specify that wire mills could place orders for such products.

Definition of Quality Carbon Steel Revised

Steel Division, War Production Board, is revising its definition of "quality carbon steel" to read as follows:

"Quality Carbon Steel" is: (a) Made in hot topped molds, or (b) if made in open topped molds receives special surface preparation at an intermediate form or in final form and is subject to special discard."

Producers whose production directives include separate tonnages for quality carbon steel may exceed these tonnages in acceptance of orders at the expense of regular carbon steel in the same product, providing: (a) They have the capacity (and, if nonintegrated, the semifinished steel) to supply the additional tonnage in quality carbon steel, (b) they have open space available within 110 per cent of their total directive for such product in carbon steel and (c) acceptance of such orders does not interfere with fulfillment of directives for other products in quality carbon steel.

Furthermore, any producer whose production directive includes provision for quality carbon steel who has not received orders for the required tonnage by the lead time for the product involved may accept orders for the same product in regular carbon steel.

Stainless Steel Producers Asked for Output Figures

Ferroalloys Branch, War Production Board, is asking producers of stainless steel and valve steels to submit by letter monthly production of stainless steel, valve steel, and total stainless types of steels for January, February and March, 1943. This letter should be submitted as early as possible to the Chromium section, Ferroalloys Branch, Steel Division, WPB.

Some Iron Ore Producers Granted Price Relief

Smaller iron ore producers are seeking higher prices. It is understood most of these companies are now permitted to charge a base price of around $4 a ton but it is said some seek a ceiling of $4.45 now applying to the larger producers.

OPA has granted an increase of 38 cents to $4 a ton on utility grade ore and 13 cents to $4.15 on Schley grade ore to North Range Mining Co., effective June 9. Evergreen Mines Co. obtained an increase, effective May 13, of 18 cents to $4.60 on 51.50 per cent iron content old range manganiferous ore from its Alstead group mines, plus 15 cents for each unit manganese over 5 per cent. OPA also granted a ceiling of $4.45 on Mesabi nonbessemer 51.50 per cent ore from new mines and an increase of 6 cents to $4.30 on same grade from old mines.

Warehouse Prices For Six Zones Named by OPA

Dollars and cents selling prices for prime quality heavy steel products sold by heavy line steel warehouses in six newly established pricing zones were announced last week by OPA.

The prices maintain the ceilings in line with those charged by warehouses on April 16, 1941.

These six new zones listed in amendment 16 to Revised Price Schedule 49 are effective June 21. The six zones provide specific prices for 19 states and parts of 5 others in the East Central, Central and Western regions. The zones are numbered 3, 6, 7, 8, 9 and 10. Zones one to four were established April 15, 1943.

WINDOWS of WASHINGTON

Not a Good Term

"POSTWAR PLANNING" is not a very good term from the standpoint of the average businessman, in the opinion of a prominent industrialist whose principal interest long has had to do with finding and promoting new uses for the products made by his company.

"We always have tried to build up our business in the past and we are doing that during the war by seeking to help Uncle Sam to the utmost," he states. "We have pretty good ideas about how we will go about promoting our business when we again will be able to use materials and labor in the normal way.

"The term 'Postwar Planning'," he continues, "has come to be associated with the ideas of some of our political idealists about developing a milk and honey economy after the war. I hope that we will have a better plane of life for all our people after the war. However, our company does not have a single word of decision and all we can do is plan on what we propose to do.

"We do not consider it as our worry if those in charge of our government intend to spend huge sums of money on public projects. We don't consider it our worry if the government continues its trend into business. What we are interested in is to work for whoever spends the money and, as far as we are concerned, that means a return to the old-fashioned way of rustling up business wherever it is to be had. There are a lot of people in this country and they will need a lot of stuff and we will block out our territory and go to work on it just as long as we are free to do so."

Postwar Credits

Postwar credits to corporations which now total 10 per cent of excess profits tax payments should be broadened to help small industries resume normal activities, Representative Dewey of Illinois, Republican member of the House Ways and Means Committee, stated recently. He said that when work is started on a new revenue bill this fall he would propose that a percentage of surtaxes also be set aside.

Wrong Impression

Certain units of the WPB Tools Division and some industrialists are suffering from the impression, that because pressure has been eased in demand for many types of machine tools pressure all through the Tools Division has abated. Certain units have been having a bad time of late in getting needed materials; the Antifriction, Chain, Foundry Equipment and Heat Treating Equipment units have been hard hit, getting steel allotments that are 25 per cent less than they regarded as minimum for the purpose of meeting war production requirements. The Heat Treating Equipment unit has encountered a difficult situation, not only because of the continued demand for additional furnaces, but because of the need for replacements on an increasing scale. Furnaces that are operated at capacity 18 to 24 hours a day wear out. Unless these units are allotted more steel in the immediate future the industries they serve are in danger of developing bottlenecks.

STEEL STOCKS CUT

Better shipping situation has substantially reduced steel stocks at eastern and Gulf ports. Some exporters believe these stocks are the lowest in many months. South American countries have benefitted materially, and indications are they will receive more steel in the third quarter than in any 3-month period since the United States entered the war.

Figures as to the amount of steel now moving and accurate estimates as to third quarter shipments to South America are not available.

The revolution in Argentina has had little bearing to date on the United States' policy of shipping to that country. Over past months very little steel is said to have been authorized by the government for shipment to Argentina, except tin plate for British account.

Small Plants Aided

Brig. Gen. Robert W. Johnson, chairman, Smaller War Plants Corp., and vice chairman, War Production Board, reports great progress is being made in finding work for small plants and that the time is approaching when 60 per cent of the contracts provided to such manufacturers will embrace products in the field of essential civilian needs.

He said that the country is coming to a period when the manufacture of some essential civilian products would be more important than the manufacture of machine guns, and that this would help small manufacturers, as in most cases their establishments are better suited for civilian than war work. One large firm, the White Motor Co., Cleveland, is retooling for manufacture of busses to alleviate the transportation bottleneck.

Minute Bottlenecks

Some amazing examples are reported of instances in which execution of important war contracts has been delayed or threatened with delay because of insignificant shortages of needed items. Completion of an important power plant was held up when the contractor found himself unable to procure ten lengths of 8-inch IPS copper pipe. Called on for help, the Philadelphia office of WPB's Redistribution Division found a quantity of red brass pipe and this was used instead of the specified copper pipe. A war plant housing project was held up by lack of four rolls of steel wire mesh; the Dallas office located a retailer who had sold four rolls of this mesh to a farmer but had not made delivery—and the farmer was glad to release the material as soon as he learned that it was needed for the war program. In one place a certain job was held up by lack of 150 pounds of steel wool, which was located by the Boston office and made available. Great progress has been made by the Redistribution Division in locating critical materials in all forms and in compiling inventories which make it possible in practically all cases to find without delay something or other that will fill the immediate need. However, the Redistribution Division could do much better if holders of materials would report them promptly as they became excess or idle, also if they report promptly as they disposed of these materials.

Caskets of Rayon

Due to stopping production of metal caskets and metal grave vaults on June 30, 1942, and as a result of a reduction in use of metals in casket hardware under order L-64, schedule A, which became effective May 1, 1943, total curtailment results in an annual saving of about 650 tons of copper, 800 tons of zinc, 1700 tons of antimonial lead and 64,000 tons of iron and steel. By making caskets of lumber and rayon, and by limiting the quality of finish, some 2500 employes altogether have been or are being diverted to war work. The new limitation order set a limit of 3 pounds of metal hardware per casket and 2 pounds per burial vault or shipping case. Lead handle arms are limited to 3 pounds per casket and steel metal liner to 50 pounds. Thus here is another of the innumerable industries which, through wartime substitutions, present problems of regaining markets for the metals after the emergency is over. Annual production of these units, incidentally, now ranges between 1,250,000 and 1,425,000, depending upon the mortality rate.

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Depends on Balance of Profits, Wages

Co-operation between industry and labor necessary if totalitarian state is to be avoided when war ends. Metal Trades leader says workers fear government encroachment as much as management

By JOHN P. FREY
President, Metal Trades Department
American Federation of Labor

EFFECTIVENESS of the American war effort is being hurt, to an indefinable extent, by a fear running through our whole midst—that the war's end will find us in some sort of a totalitarian state. Some people cry out against what they think is an encroaching Fascist state, others against an encroaching Communist state.

The great majority of us, not being dialecticians, don't shape up our dread in any one rigid formula. We visualize something, instead, by which private enterprise and private initiative will be submerged under an overall government.

By private enterprise and private initiative, I mean a free system by which investors, men with capital, will dare risks of enterprise in the hope of receiving an adequate return. And by private enterprise and private initiative, I mean a free system under which workers will be able to select their employer and to be protected in their right to bargain collectively with him, a right to gang up, if you please, to assure themselves a fair return for their abilities and energies.

Private Enterprise Endangered

I believe the organized workers whom I represent—there are some 1,500,000 in the Metal Trades Department—and the industrialists are together in a fear, perhaps vague, that this system under which we have lived is endangered.

We have had our quarrels, management and labor, in the past. They have been a bitter phase of our competitive way of life. We have all gained by them, both management and labor, and I am quite confident that we stand together in not wanting the free enterprise system changed.

The members of the American Federation of Labor, to the extent to which I represent them, are certainly as much concerned today in preserving this system as any industrialist could possibly be, and as I have viewed the rapidly moving parade over recent years I am inclined to think that we are more concerned.

Speaking for myself alone, I am an apostle of the Samuel Gompers philosophy that when the trades unionists of this country begin to depend upon the government for their strength, they are in as much danger of losing their freedom as were the workers of the totalitarian states—Germany, Russia and Italy. I say the same thing of the industrialists who have come increasingly to look to the government for the solution of their problems.

We have both been too prone to lean upon the government in recent years but I shall perhaps shock you when I give it as my conviction that the industrialists have been far greater offenders than we. Furthermore, if this government controlled economy which we mutually fear, comes to our country, it will be at the hands of the industrialists rather than the trade unionists of the American Federation of Labor. I miss my bet if I am not correctly reflecting their determination to resist it with all the strength at their command.

One of our most respected labor leaders for many years, Mr. Frey is a firm believer in the American free enterprise system. In the accompanying article, he makes the point that the system will work only if wages are increased as profits rise. Analyzing the causes of the depression that started to engulf our economy in 1929, he attributes the principal blame to maldistribution of profits. Wages, he says, did not keep pace with rising profits and rising dividends. Mr. Frey's statement, coming from a labor leader, is one that should receive careful study, particularly by employers who are preoccupied at this time with plans for a sound postwar economic structure.

—The Editors

I have been an international officer in the American Federation of Labor for some 30 years, all of my adult life. The movement itself is more than 60 years old. I have grown up with it and inasmuch as its development coincides with the industrialization of America, my career in labor organization coincides with this industrialization. It is an American movement, born in America, grown up in America, steeped in the American traditions. It has the virtues and the shortcomings of the country itself. It will never sell the country down the river because to do so would be to sell the millions of Americans who constitute its membership down the same river.

In the pre-Pearl Harbor days it was not the American Federation of Labor that kept up a steady tom-tom against industry for not then and there converting; it was not the American Federation of Labor that imputed unpatriotic motives to the great industries; it was not the American Federation of Labor that loaded up Washington with planners of every description. These vociferous voices of the time were not of our councils. They came from elsewhere.

Now, frankly, I do not foresee the loss of our freedom—our freedom of action in industry and our freedom of action as trades unionists—through any man on horseback, or through any group of power-thirsty designers, notwithstanding there are men on horseback and power-thirsty groups on every hand watching for an opportunity.

Danger Is in Controls

Our danger, as I see it, is in the trend of the times. War necessitates certain controls over our lives. Certain controls over industry with a view to co-ordination were necessary.

It will remain for history to show whether or not the severity of these controls did not militate against production.

But industry is placed under severe control. What then? There begins a clamor to regiment labor by way of being fair. Somewhat ahead of the complete regimentation of labor comes another movement out of the pot of envy—regiment the women also. Undoubtedly there will soon be an agitation for a regimentation of those youngsters not yet ready for the draft. It is the spirit of the times, and herein lies danger for our future.

But bear in mind, this agitation for the state in which industry has been placed, did not come from my fellow trade unionists. You would be surprised at the alarm with which most of us have viewed it. And we have our troubles with the bureaucrats too.

I am frequently finding among my industrialist friends and acquaintances a spirit of despair. I have seen men of ability and energy from the industrial world rushing to Washington for a job

MR. FREY

in the conviction that henceforth the government will be the only outlet for a man's energies and abilities. You won't find that as prevalent among the trade unionists. It is a dangerous state of mind.

We trades unionists, those of us of the Metal Trades Department of the American Federation of Labor, because they are whom I am authorized to speak for, would like to give encouragement to those industrialists who are concerned about and who are making a fight for the preservation of our American system. We shall not forsake them. Our stake is greater than theirs because it is the worker to whom enslavement is the most poignant.

These industrialists should be permitted to set aside adequate reserves for the peacetime transition of their plants. I am unalterably opposed to the destruction of the private enterprise spirit through taxation.

There is, I think, a realization on the part of every sensible man that if private industry does not, or is not capable of giving employment to our workers after the war, that the government will do it—must do it. It is not a matter of advocating this so much as knowing the facts of life. But we want to make sure that the government gives industry the opportunity to create this employment. We must not sit idly by and permit bureaucrats and planners to first shackle industry with restrictive legislation and then point an accusing finger and say: "You see, you can't do the job."

Manifestly, there will need be some government work projects to assist in giving employment. They should be planned for their usefulness and wealth creating value instead of being a dressed-up version of the dole. And with a view to stimulating a reorganized industry they should be carried out through our industrial setup, not used for the further encroachment of government in the field of private enterprise.

Because of the meaning which has come to be attached to the term in recent years I do not take kindly to the statement that government and industry should in the future form a partnership. I have always had my doubts about the vaunted efficiency of the totalitarian states even to wage war. But there is one thing I am convinced of and that is that there can be no 50-50 situation, that is to say a half totalitarian economy and a half private enterprise economy. My suggestion is that the far better partnership of the future should be between management and labor. By this, I do not mean that we of the Metal Trades Department want to take over or to share the management of industry.

In planning for a sound future economy both industry and labor must be determined to bring about a fair distribution of the national income. When workers are denied an equitable proportion of industrial profits their ability to purchase goods is lowered. Failure to raise wages with profits results in a shrinkage of markets and the resulting necessity of curtailing production. That brings about unemployment and depression.

Discusses 1929 Business Collapse

Careful analysis of what went on during the fateful years ending in 1929 reveals that industrial and business management, through failure to recognize this truth, contributed materially to the severity of the depression that followed. During those years, industrial and business management utterly ignored the basic fact that to have and maintain prosperity it is essential to keep the purchasing power of the public at a high level.

A few statistics prove the truth of this contention.

In December of 1922 the capital of the banks in the Federal Reserve System was $1,940,000,000. In December of 1929 this had increased to $2,757,000,000. Surplus in these banks in December of 1922 was $1,625,000,000. Surplus in December of 1929 had increased to $2,864,000,000. Their undivided profits in December of 1922 was $797,000,000. These undivided profits in December of 1929 had increased to $1,086,000,000.

In 1922 the holders of stock in these banks were paid dividends of $246,000,000. In 1929 they received $408,000,000 in dividend checks.

During the period following 1922 the annual value of manufactured products increased enormously, but not as rapidly as the bankers' profits. Total value of products manufactured in 1923 was $60,529,000,000. Total value of manufactured products in 1927 was $62,718,000,000. Total value of manufactured products in 1929 was $69,417,000,000.

During this period, when profits were great, when dividends were large, when value of the manufactured products was rising, what happened to wages?

In 1923 total wages were $11,007,000,000. In 1925 total wages were $10,730,000,000. In 1929 total wages were $11,621,000,000. In brief, wages did not keep pace with the rise in profits and dividends. Wages were not elevated sufficiently to maintain public absorption of durable and consumer goods as fast as they could be produced.

Welcome Technological Gains

The lesson so painfully learned in the great depression of the thirties is one that industrial management as well as labor will have to bear in mind in the period ahead.

Intelligent labor leaders must welcome technological improvements that increase efficiency and bring about increased production on the part of the individual. Only by increased production per individual can we continue to improve our plane of life, thus not only providing greater comfort and luxury for our citizens, but adding to the amount of time which we can spend in leisure and in recreation, and in satisfying our cultural needs.

At the same time, technological improvement must not be permitted in the future to imperil our economy. It is to be hoped that industry in the future will follow a policy of dismissing men from their jobs only after other jobs have been found for them. Only by such a policy can the nation's general prosperity be maintained.

At the same time, it is to be hoped that industrial management in the future will be mindful of the fact that wages mean purchasing power, and that wages and dividends must be kept in balance.

It seems to me that nothing is more important in planning for the postwar period than a clear understanding by management and labor of the problems which they face, coupled with a joint willingness on the part of management and labor to work out joint understandings which will result in an economically sound distribution of the annual volume of wealth created by the joint action of management and labor.

PRIORITIES-ALLOCATIONS-PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives, issued by War Production Board and Office of Price Administration

CMP REGULATIONS

STEEL ORDERS: Producers who accepted authorized controlled material orders for April delivery and who were unable to make delivery either in April or May have been instructed to fill such orders as soon as possible. This alters original provisions of CMP Regulation No. 1 which required that shipments of authorized controlled material orders be made in the month requested or in following month.

Since April was the first month of operations under CMP, a substantial number of April orders have been carried beyond the end of May. If a report of all such orders and a suspension of production pending WPB advice were required, deliveries would have been unnecessarily hindered.

ALLOTMENTS: A quarterly basis has been established for allotments as well as applications for allotments in place of the original monthly basis. As reported in the June 7 issue of STEEL, monthly percentage restrictions, previously imposed on placement of controlled material orders, have been eliminated from terms of CMP Regulation No. 1.

Controlled material allotments made to a consumer for a particular calendar quarter or other specific period indicated on the allotment certificate may not be used for placing authorized controlled material orders for any other period. A consumer must specify on his order date of month in which delivery is requested, within the period for which his allotment is valid. The mill is required to make delivery as close to the delivery date as practicable.

ORDER TIME LIMIT: Provision of CMP Regulation No. 1 that a controlled materials producer is permitted to make deliveries up to 30 days after the last day of month in which delivery is requested, applies only to orders which were accepted on basis that they could be filled by the required delivery date. In such cases, it is permissible to make delivery even though the month in which shipment is made is after the end of quarter for which allotment is valid. A controlled materials producer may not accept orders if he does not expect to be able to fill them during requested delivery month.

DATING PROCEDURE: Numerical method of identifying months and quarters previously prescribed has been abolished, effective July 1. Allotments will be required to show quarter for which purchase authority is valid instead of "quarter number" formerly used. For example, "third quarter 1943" or its abbreviation "3Q43" will be used instead of "19." Orders for controlled materials must indicate month in which delivery is required instead of a month number. For example, "July, 1943," as well as the quarterly identification must be used.

SMALL ORDER: Persons using "small order" procedure to obtain Class A products requiring small amounts of controlled materials, need not reduce allotments they have received by amount of controlled material required to produce such product.

SAMPLE ORDERS: Deliveries may be made by a controlled material producer to fill a sample order in a case where the customer certifies that the controlled materials covered by such order are required for testing purposes in connection with war production. Aggregate amount of any item of controlled material delivered to any one customer in any one month for testing purposes may not exceed one per cent of minimum mill quantities prescribed with respect to such items in Schedule IV of CMP Regulation No. 1.

CONTROLLED MATERIALS LIST: List has been modified as follows: (1) both carbon and alloy steel die blocks are included as controlled materials; (2) term "pipe" (both carbon and alloy steel) is clarified to indicate it includes threaded couplings of type normally supplied on threaded pipe by pipe mills; (3) listings of both copper and copper-base alloy products are spelled out by the amendment in greater detail than they have been heretofore.

TIME, QUANTITY FACTORS: Schedule III, reflecting numbers of days orders must be placed in advance of first day of month in which deliveries are requested, has been amended with respect to tubing. Schedule IV has been amended with respect to minimum mill quantities for tubing. (CMP Reg. No. 1).

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L ORDERS

AUTOMOTIVE VEHICLES: War Production Board has been empowered to issue from time to time letters of authority which will authorize manufacturers to produce a given number of automotive vehicles of the types specified within given periods of time. The amended order also provides that producers of medium or heavy trucks or off-the-highway vehicles may schedule their production, notwithstanding provisions of Regulation No. 1, as if the purchase orders for them bore a rating of AA-2X. (L-1-e)

SEWING MACHINES: Manufacturers must reserve specified number of machines for orders from Army, Navy, Maritime Commission, War Shipping Administration and for Lend-Lease. Release from reserve stocks must be specifically authorized by WPB through application on WPB-1319 (formerly PD-556). (L-98)

MUSICAL INSTRUMENTS: Control over use of critical materials has been extended to cover repairing and overhauling of musical instruments. Tin may be used in solder; and zinc in brass. Copper may be used in manufacturing, repairing or replacing electricity-conducting parts up to two pounds for each repair job, or to one pound more than the copper scrap recovered in the job. Use of iron, cork and lead is not prohibited by the order. Production of pianos and organs requires specific WPB authorization and use of critical materials must not exceed 10% by weight. (L-37-a)

ELEVATOR EQUIPMENT: Inventory of maintenance parts may be maintained up to $25 worth for each elevator operated, provided not more than $50 worth of such parts per elevator are purchased in any one year. (L-89)

ROTARY FILES: Number of sizes which may be produced has been cut from 380 to 70 through addition of Schedule 4 to order L-216. Shanks for rotary files of ⅛-inch diameter or more must be made of carbon steel only. Producers may apply for permission to devote up to 10% of their output to special cutting tools which do not conform to specifications. (L-216)

HARD FACING MATERIALS: Certain low-alloy hard-facing compositions may now be used for repair and maintenance of agricultural tillage equipment. Deliveries are restricted to orders rated AA-4 or higher for maintenance and repair of specifically mentioned end-products which now include welding electrodes. Purchasers must certify to their producers (after June 15 to a distributor as well) as to end use of hard-facing materials. Necessity for filing PD-733 has been eliminated and PD-734 has been revised. (L-223)

PROCESSING MACHINERY: Production quotas on certain types of food processing machinery may be established and in meantime output is restricted to 1942 rate. Commencing Oct. 1 and for year ending Sept. 30, 1944, manufacturers may produce up to 50% of average yearly production during base period 1939-1941. No restrictions placed on quantity of replacement parts. Purchase and delivery orders must bear AA-3 or higher rating obtained under L-41 and assigned on WPB-617 (formerly PD-200); or for canning machinery or equipment listed in Schedule A, rated AA-3 or higher assigned on WPB-576 (formerly PD-285); or for dairy, egg or poultry processing equipment listed in Schedule A, rated AA-3 or higher assigned on WPB-748 (formerly PD-414); or order received prior to June 5 for items to be delivered on or after June 30 and has been approved by WPB; or a purchase order bearing AA-3 or higher assigned on PD-1A. These restrictions apply to new machinery valued at $50; to used, reconditioned or rebuilt machinery valued over $300. Rating for canning machinery may be obtained under P-115 and ratings for dairy processing equipment under P-118. (L-292)

M ORDERS

Cans: Quota for packing paint, varnish, lacquer or other protective coatings in fibre-bodied cans with blackplate ends has been increased to 55% of the area of plate used during 1942. Restrictions prohibiting use of blackplate cans for drain cleaners and lye after June 30 have been removed. Use of blackplate cans for toilet bowl cleaners is restricted to 75% of area used in 1942 for period from Jan. 1 to Sept. 30, 1943; to 12% for period from Oct. 1 to Dec. 31. Twelve additional non-food products have been added to list which may be packed in cans while specified species of fish may be packed in cans made of 1.25 hot dipped tinplate. Can manufacturers may use any "menders" arising in production of 0.50 tin plate. Manufacture of metal keys for opening cans, except for armed forces, has been prohibited. Cans for packing any food or non-food product not listed on Schedule 1 or 2 are exempted from M-81, if the cans are required for packing a product for delivery to a ship chandler, marine distributor or marine operator. (M-81)

Chlorate Chemicals: Producers and distributors should make application for allocation (now on a quarterly basis) on PD-602 listing individually requests for more than 250 lb. per quarter; customers need not file any forms with WPB. Specific authorization is not required for delivery to any person in any quarter of not more than 25 lb. of any chlorate chemical (M-171)

STUDS AND BOLTS: Alloy steel studs and headed bolts for high temperature service have been added to list of critical components subject to scheduling control by the Building Materials Division, (M-293)

STEEL STRAPPING: Following additional uses are now permitted: (1) For wooden ship-

ping containers in which vitreous china plumbing supplies or fixtures are packed; (2) use by railroad or truckers where needed to reinforce containers damaged in transit; (3) for fastening together group of filled containers into one unit. (M-261)

PRIORITIES REGULATIONS

ORDER REJECTIONS: Manufacturer or other vendor is forbidden to reject an order bearing a preference rating on the ground that price offered is below the regularly established price, if the purchaser meets the OPA ceiling. (PR Reg. No. 1)

APPLICATION AND EXTENSION OF PREFERENCE RATINGS: Uniform methods in applying ratings to obtain preferential use of processing and fabricating facilities has been provided. A rating assigned by WPB to permit a named person to obtain use of particular facilities may be applied only by that individual and then only to the specified facilities. When a person is authorized to apply or extend a rating to obtain material which he will deliver, or which he will incorporate in material to be produced or delivered, he may make use of the same rating to obtain use of the facilities of a concern regularly engaged in the business to produce the rated material. A person to whom a rating has been extended to obtain use of his facilities may not himself extend the rating for any purpose. List A of Priorities Regulation No. 3 names products and services which may be delivered without regard to preference ratings; List B contains items not subject to any ratings assigned to purchase of MRO supplies. List C includes items which may be obtained by use of only ratings assigned or authorized by specified "M" and "P" orders. (PR Reg. No. 3)

FARM MACHINERY: Farmers may now obtain items of general industrial equipment frequently used on farms without furnishing A-1-c priority ratings, required by others, by certifying to dealer that he is a farmer and needs the equipment in operating his farm. It may be used in purchasing fractional horsepower motors and other items in "list A" attached to L-123. (PR Reg. No. 19)

PRICE REGULATIONS

STEEL VALVES: OPA has exempted, effective June 7, from price control steel valves, valve parts and subassemblies as well as any operation performed in the processing, machining, welding, treating or finishing of these items when sold or performed by new subcontractors to and for valve manufacturers under contract with the Navy department for these articles. (GMPR)

IRON AND STEEL PRODUCTS AT RESALE: A number of corrections, largely on typographical errors in the printing of amendment No. 14 to revised price schedule No. 49, have been issued by OPA. Corrections became effective as of April 15.

MACHINES AND PARTS: In calculating period of depreciation in computing maximum prices for second-hand machines and parts, the computation should begin with date of acquisition by original purchaser for use. Depreciation for sales by Defense Plant Corp. is figured from date of initial use after acquisition by DPC. Sellers of second-hand machinery are permitted to add actual transportation charges from Seattle to the job sites in sales to Alaskan buyers. Producers using rubber in manufacture of machines or machinery parts for government use may quote higher than ceiling prices to reflect cost increases resulting from an authorized increase in price for crude rubber. (No. 136)

U ORDERS

COMMUNICATIONS: Ratings and symbols assigned to telephone and telegraph operators by order U-3 and U-4, respectively, may be used to obtain maintenance, repair and operating supplies for offices, warehouses and other facilities essential to business operations. (U-3 and U-4)

New Producers of Flanges Granted Mark-up on Government Orders

METHODS for establishing ceiling prices for cast steel, forged steel, and steel plate flanges sold for use in the war program by new producers who cooperate in the government program to ease a temporary nationwide shortage by undertaking production of these articles have been announced by Office of Price Administration.

To cover handling costs, a mark-up of 11 per cent over total production costs is fixed as a maximum for new producers who use facilities of small foundries and machine shops on a subcontracting basis to augment current production of flanges. This was provided in amendment 6 to order A-1 under price regula- No. 188.

Generally, the amendment is applicable only for producers who prior to Jan. 1 were not engaged in flange manufacturing, and who will sell and deliver before Aug. 31 flanges produced for ultimate use of the government.

In determining cost of manufacture, new producers will include cost of the rough flange, cost of machining and drilling, and cost of spot facing rough flanges, when computed in accordance with ceilings established by applicable price regulations. Actual transportation charges paid by the seller to obtain deliveries of the flange from foundry or machine shop to seller's place of business may be added. To cost of manufacture, the producer may add the 11 per cent mark-up. Under previous provisions of regulation No. 188, new producers would be compelled to use March, 1942, labor and material costs, a factor which would impede subcontracting efforts.

OPA emphasized that the amendment is not applicable to flanges made under contract or subcontract with the designated government agencies after Aug. 31, or for sales of flanges made for civilian use or consumption at any time.

Appointments-Resignations

Joseph L. Weiner has resigned as director of the Office of Civilian Supply, War Production Board. This office was replaced on April 15 by the new Office of Civilian Requirements under Arthur Whiteside.

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J. F. Skillman has been appointed chief of the Ferrous Metals Section, Materials Branch,WPB, succeeding C. S. Snyder who has resumed his post with Republic Steel Corp. Mr. Skillman was formerly Detroit manger for Berger Mfg. division, Republic Steel Corp.

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John S. Chafee has been appointed director of the Tools Division, War Production Board. Mr. Chafee has been deputy director of the Division and was formerly vice president of Brown & Sharpe Mfg. Co., Providence, R. I.

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George E. Talmage Jr. has been appointed assistant director of Division of Traffic Movement, Office of Defense Transportation. He will be in charge of the Export-Import Traffic section, succeeding John M. Montigney.

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Ellsworth E. Clark has been appointed assistant general counsel in charge of the Rationing Legal Division, Office of Price Administration.

Conversion of Kilns to Charcoal Production Urged

Clay products plants, operating at only 35 per cent capacity due to curtailment of building programs, can readily be converted to charcoal production and thus lessen the critical shortage of this war material, War Production Board says.

It is estimated June output will be sufficient for only 80 per cent of military and essential industrial requirements, without taking into consideration normal civilian consumption for which no charcoal is available.

In addition to its military uses, charcoal is needed for producing copper, brass, bronze, nickel, high carbon ferro chromium, ferrosilicon, glass and other important purposes.

An appeal is being made by WPB to operators of clay products kilns situated in wooded areas to convert to charcoal production.

Crown Manufacturers Seek Frozen Black Plate Stocks

Crown manufacturers have inaugurated a campaign to comb the country for steel, particularly black plate, which has been frozen in the hands of various manufacturers by War Production Board conservation orders. Only tin mill black plate rejects and electrolytic waste-waste may be used for crowns. It is estimated that about 15 per cent of current consumption of crowns is being used to bottle beverages for the armed forces.

THIS STAMPING CONVERSION ZOOMED production 1300%

CASTING

STAMPING

A manufacturer needed faster production on an order for thousands of these brackets. His engineers worked out a time-saving redesign that called for stampings instead of castings.

After the change-over this is what happened: Production zoomed from 25 to an average of 350 an hour—an increase of 1300 per cent! Four small presses and an electric welder turned the trick. No machining was needed to finish the stamping. Castings required additional drilling and countersinking.

The bracket illustrated on this page shows how small though important parts have been converted from castings to stampings. Many of these conversions also save metals that are more critical than steel. Alert designers have achieved the same results with larger equipment, saving valuable machine-hours.

Are you keeping a war-eye open for opportunities like these, or thinking of peace-time products that might benefit from stampings? Consider ARMCO's special-purpose sheet steels. They can help you do the job you want. Write to The American Rolling Mill Co., 1311 Curtis St., Middletown, O.

SPECIAL PURPOSE ARMCO SHEET METALS

THE AMERICAN ROLLING MILL COMPANY

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

War program expansion forces upgrading of supervisory and managerial talent in automotive plants. . . New rubber life rafts for ocean-crossing aircraft more completely equipped . . . CAP valuable supplementary transport service

WHEN Hal Howard, head of Chevrolet plants in Flint, Mich., was asked the other day what his company had gained from war production activity thus far, he gave an unexpected answer, but at the same time it was an observation which doubtless applies to nearly all plants in the metalworking industry now engaged in the feverish rush of war production.

Early in the conversion stage, Chevrolet was called upon to furnish supervision to new plants outside the Flint area which were gearing up for war production. This meant that the company had to draw on its so-called "first-line" executive talent from the Flint plants. Departure of these officials necessitated moving up the "second-line" supervision into the top ranks. This group comprised superintendents, assistant superintendents and others in a similar category, who found themselves suddenly moving "upstairs" into managerial tasks vacated by the top-ranking men who had gone out to new jobs.

Promotions Speeded Up

Naturally the posts emptied by the "second line" had to be filled by the "third line" supervisory men—foremen, assistant foremen, plant engineers, etc. In other words the entire supervisory and plant management family found itself moving up one or more notches into more responsible positions, elevations which in the normal course of events might have been spread out over five or ten years, yet under the pressure of war were bunched into a matter of months.

Howard pointed out it was a source of considerable encouragement the way his men stepped in to shoulder their new tasks. The change has a two-fold benefit, the men improving their position by virtue of added responsibility and the company gaining because of the increased reservoir of technical and managerial skill. This immediately implies the postwar problem of absorbing and taking advantage of such an administrative asset. Either industry will have to maintain its accelerated tempo, or the newcomers in ranking positions in management will have to step down the ladder one rung to their former positions. The latter is a difficult alternative, and men faced with it likely will seek new company affiliations rather than take what appears to them to be a step in the opposite direction to progress.

Chevrolet plants, particularly those in Flint, were among the last to move into full-scale war production, principally because of the pressure of expansion elsewhere. Now, however, the 35 plant buildings in Flint are nearly up to the peak peacetime level of employment—around 15,000—and are looking to further increases. Eleven of the plants are devoted entirely to war production, covering such products as armor-piercing shot, combat vehicles, component parts for Pratt & Whitney aircraft engines which Chevrolet is building at Tonawanda, N. Y., 90-millimeter antiaircraft guns, motors and motor parts, tools, dies, jigs, sheet metal parts, trucks, etc.

A special type of combat vehicle has been in production there for some time, but for some unexplained reason the Army will permit nothing to be said about it, despite the fact over 1000 have been assembled thus far, and anyone who cares to can see them dodging around the main streets in Flint. (This writer saw a whole trainload of these combat vehicles on a siding near Los Angeles recently.)

Rubber has gone to war in a hundred ways with which the average citizen is entirely unfamiliar. There is nothing particularly secret about these new usages, but they just never come to the attention of most people, and the rubber companies are not doing any excessively loud talking about them. One of the newest developments is a 7-man collapsible life raft for airplane crews, which is complete down to the last detail. Known as the E-1 life raft, it was developed by United States Rubber Co. working in conjunction with engineers at Wright Field, who took advantage of field reports from such men as Capt.

One of 26 women workers in the shop of a Detroit Chevrolet dealer now subcontracting on war production work, Mrs. Albert Bendetti is gas welding a fitting on a radial engine intake manifold

Eddie Rickenbacker and others forced down in ocean waters. Compared with the original rubber rafts, the new model is luxurious down to the last detail. Oars, mast, sail, several types of rations, fishing tackle, bait, two-way radio, emergency water, sea marking compound, harpoons and dozens of other accessories are compacted into a neat bundle taking a minimum amount of room in a plane yet providing exceptional accommodations for bomber crews who are forced to take to the deep. Equipment even includes eight pages of fishing instructions printed on waterproof paper.

An appendix to this little treatise deals with emergency food other than fish, the following being one choice paragraph: "All animals are safe to eat—monkeys, bats, lizards, land turtles, frogs and even snakes, including poisonous snakes, if they have not bitten themselves. Snakes taste like frog legs or the white meat of chicken. Grubs found in the ground or in rotten wood make good food. So do grasshoppers, toasted on a stick. Pick off legs and wings before cooking. But do not eat caterpillars. Many are poisonous."

Conductive Rubber

One of the newest types of rubber which is finding military and war plant uses is the so-called "conductive" rubber, capable of transmitting electric current. This is an apparent anomaly, since rubber has always been thought of as an insulator, yet by adding extra amounts of lampblack (carbon) and other compounds to the crude mix a rubber is obtained which will conduct static charges and avoid sparks where they might be dangerous.

The material is visioned as having significant postwar uses in the form of heating elements, perhaps wall sections into which current might be fed and transferred into heat.

Not many automobile dealers have been able to get very far in subcontracting work for war production plants. Some time ago, STEEL described how a Youngstown, O., dealer organized a program of subcontracting. More recently details have been learned of how the Eastern Chevrolet Co. here adapted its facilities to production of subassemblies for radial aircraft and tank engines. Under direction of Ray M. Whyte, the company built up around a nucleus of former service department and office employes an organization which now supplies insulated intake manifolds for radial engines mounted in M-4 medium tanks; installing flanges, drilling, threading, burring, welding on auxiliary pipe, Parkerizing, priming, enameling, baking, inspecting and shipping these manifolds; and also does several finishing operations on the cowling of tank and airplane engines. The plant employs 26 women and 27 men, the women mostly former housewives from the neighborhood who were given special training in welding and in other essential operations.

The motor industry is making good use of "courier service" established by the Civil Air Patrol, aimed to link the country's war plants more closely by providing airplanes for emergency shipments of small parts. Here is an example of a recent mission: A Chevrolet Michigan plant was in urgent need of some tubular parts for a military product. Tubing furnished by a supplier in Muncie, Ind., and processed by another subcontractor in Warren, O., had to be delivered in a matter of hours to avoid a shutdown. So, at 2:30 one afternoon a CAP plane from the Detroit Wing took off for Muncie and by 5:30 had the parts aboard and was off for the Youngstown, O., airport. Weather forced the plane down at Mansfield, O., so the resourceful pilot engaged a truck to forward the shipment to Warren. In the morning the plane took off for Youngstown and picked up the parts which had been processed during the night. A defective exhaust stack forced the plane down at Detroit, but the shipment was transferred to another CAP plane and arrived less than 24 hours after leaving Muncie.

While the incident demonstrates the valuable aid being furnished plants by such groups as the CAP, it also demonstrates two serious fallibilities of air transport—weather and equipment breakdown. Until these are overcome, the air will continue to be just a tributary to the nation's freight transportation channels.

Gear shaving vs. gear grinding is a topic for discussion when airplane engine and automotive company process men get together to mull over their problems. Automotive companies have long favored the gear shaving process because of the time savings it permits, and also because of difficulties in obtaining sufficient gear grinding machines. The aircraft engine builders prefer the grinding process although they are feeling their way into gear shaving.

Saves Time

As an example of the time saving possible by shaving, certain gears which require 1 to 3 hours to grind can be shaved in 6 minutes. The shaving is usually done on "green" gears, which are heat treated and quenched after shaving. This calls for special quenching fixtures to hold the gears firmly to avoid distortion in the quench. However, steel up to 35-40 Rockwell C hardness has been handled readily by gear shavers, it is reported.

The policy of one aircraft engine manufacturer with regard to gear shaving is outlined as follows:

1. Shaving is desirable where, because of the design, a hardened gear cannot be ground.

2. Shaving is desirable on gears which do not require hardening and where a saving in time or equipment can be effected.

3. Shaving is acceptable in hardened gears wherein accuracy can be maintained and where production is sufficient to warrant the use of complicated quenching fixtures. In this case the best method has been found to be shaving gears after carburizing and before hardening.

Another subject which engine builders have been pursuing is impregnation of magnesium castings before use. One engineer has defined a magnesium casting as "a series of holes surrounded by metal," indicating how serious the porosity problem is. Two sources furnishing magnesium castings impregnate them with tung oil. Another interest uses sodium silicate, impregnating castings after machining and testing for leaks, if necessary. One engine company places magnesium castings under 28 inches of vacuum for 15 minutes with temperature of 250 degrees to insure good penetration of tung oil into the castings.

PIPE CLEANERS

Pipe cleaners, those fuzzy little gadgets of fine wire and wisps of cotton, ordinarily are not considered critical war material. However, a shortage nearly disrupted production in the Detroit Diesel Engine Division of General Motors recently.

Detroit Diesel uses a couple of thousand pipe cleaners a month. They are dipped in a solution of glue and abrasive and used to lap heat scale and other foreign matter from the inside diameter of eight small parts for diesel engines.

Usually they were bought from tobacco jobbers, but the gadgets have practically disappeared from the market due to the jobbers' inability to extend priority ratings for steel to the manufacturers.

Detroit Diesel's supply was almost exhausted. Company put its expediters to work and several thousand were obtained when the company extended AA-3 and AA-1 priority ratings to the makers; diesel engine production was not interrupted.

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IN HAPPIER DAYS TO COME we will all have better, safer automobiles — more efficient refrigerators, washing machines and vacuum cleaners . . . . farmers will have better, stronger tractors and other tools and machines . . . . aircraft will continue to set new standards in speed, comfort and safety . . . . all made possible, in part, by the Wesson development of Carbide Cutting Tools to such high standards that they cut tougher metals than ever before — with greater precision — and at greater speed.

BATTLE-SCARRED VETERANS Look To Industry

Return of wounded soldiers and sailors confronts employers with increasingly important problem of providing suitable occupations for the disabled in jobs which fit their capabilities. . . Industrialists "leaning backward" to aid government program

REHABILITATION of the nation's war crippled and handicapped veterans looms on the industrial horizon as an increasingly important problem.

Success of the elaborate plans of the government for placing these heroes in gainful employment, it is recognized, hinges upon the degree of co-operation given by employers. And industry, cognizant of its responsibility, is responding wholeheartedly.

Only recently the subject of industry's role in the rehabilitation of wounded soldiers and sailors came into the headlines with the announcement the National Metal Trades Association, an organization with a membership of 1000 companies employing well over 1,000,000 workers, had recommended to its members the employment of disabled and incapacitated ex-servicemen. The association, which among other things sponsors practical machine operator and apprenticeship training programs, declared utilization of the disabled soldier has "tremendous possibilities" for not only aiding ex-servicemen but industry and the nation as well.

Battle-scarred veterans of Pearl Harbor, Midway, Guadalcanal, Tunisia and other campaigns—many mere youngsters—are being rehabilitated in Army, Navy, and Marine hospitals and various institutions to play another important role in World War II. Some are returning to battle. Others, no longer fit for military service, are being placed on the nation's gigantic assembly lines producing materials of war. And with huge casualty lists expected as the war progresses, the role of industry in this humanitarian and necessary work will grow apace.

Only a trickle of casualty cases has been routed to the nation's production army so far. But the machinery for preparing the war's disabled for useful work already is in operation. Through the close co-operation of industry, military hospitals, rehabilitation institutions, the United States Employment Service and the War Manpower Commission, it is expected the problem of fitting these veterans into well-paying jobs will be solved.

By J. M. KURTZ
Assistant Editor, STEEL

Comparatively few veterans of the present war have returned to industry, but great numbers of them have been rejected at military training camps because they are unable to withstand the rigors of military life. Latent hernia has developed from vigorous exercises in some cases. Mental strain has occurred in others.

War casualties seeking employment have been few so far. The fact they will be increasing soon, however, is indicated by the recent arrival of several shiploads of wounded from North Africa.

Severe cases are being handled by local draft boards. Each board has appointed an employment committeeman whose duty it is to place the ex-soldier in a war job. Responsibility of finding employment for them has been placed in the hands of local draft boards because each board desires a record of the individual. And also, they see to it that employers live up to the provisions of the law requiring seniority preference of inducted men.

A number of problems have been encountered by local draft boards. Some employers have discontinued business since the outbreak of the war. Many others are in non-essential activities. Wherever possible attempts are made to place the veterans in essential occupations.

Actually little difficulty has been encountered in placing the disabled since industry has made requests for discharged servicemen. The War Manpower Commission and the United States Employment Service report industrialists have been "leaning backward to rehire ex-

servicemen in responsible positions."

Re-employment of the disabled servicemen is within the jurisdiction of the Veterans' Bureau. War Manpower Commission offices nearest Army, Navy and Marine hospitals register the disabled and question them regarding employment. Applications are forwarded to veterans' employment representatives, there being one in virtually every state. This procedure is regarded as interim and will probably change as the flow of disabled increases.

The filing records of the Special Services Division, USES, are available to veterans' representatives. These files contain specific information on companies in the various areas which will accept certain types of handicapped individuals. Knowing how to place handicapped civilians means also knowing how to place veterans. For example, a certain bronze manufacturer will hire deaf mutes, heart cases, hernia cases, and persons with one eye. A valve manufacturer employs persons with leg injuries, the hard of hearing, and mental cases. The file is so complete that few handicapped persons with ability are turned away.

The handicapped are paid the same hourly rate as normal employes. Men without legs were employed last year as draftsmen, clerks, drill press operators, machine operators, and handymen to name only a few. Men with hernias were found capable of performing light machine shop work and in some cases were able to perform hard labor. Especial care is taken in placing epileptics. Mental cases are placed in less arduous positions.

An outstanding example of industry's co-operation to aid the disabled veterans is provided by the Gray Mfg. Co., manufacturer of communications equipment, Hartford, Conn. Recently in an advertising message addressed to disabled veterans, W. E. Ditmars, president of the company, said:

"We would like to help you fit yourself back into a happy productive life and we feel that perhaps we can help. There are jobs open in our plant from time to time which you may be able to fill. Some of these jobs involve little activity, are only moderately manual, and are important.

"Presence Will Be Inspiration"

"Our desire to help you get 'into production' is not based on sympathy or on a sense of obligation (as grateful as we are to you for what you have given our country), but on the cold hard fact that we know you want to continue to work for victory. We and the country need your continued help. We know, too that your presence here will be an inspiration and incentive to us to give our best to war production."

Realizing the effort of one company in such a tremendous project would be infinitesimal, Mr. Ditmars in a second advertisement sought to encourage other industrial plants. His message was:

"We pass the idea along to you and invite you to use it also . . . in the public print . . . for the public good."

Mr. Ditmars then quoted Brig. Gen. Alden H. Watt as saying: "The casualty lists are mounting. By spring lists will appall us and we shall begin to realize how serious the war has become. Then the entire nation will be ready to go all out for victory, and right then we shall start to win the war."

Shortly after this advertisement appeared, Representative Miller, Wethersfield, Conn., suggested to President Roosevelt a survey be made of government positions outside the classified service with the view of finding employment for veterans discharged from service because of war-incurred disabilities. He read the Gray company's advertisement on the House floor.

"I hope other manufacturers will copy the idea because this is a problem which will soon have to be faced, not only by industry throughout the country, but by the federal government as well," Representative Miller commented.

When read on the Senate floor by Senator Danaher, the idea was characterized as "worthy of more than passing notice. It is a stimulating thing in these times," said Senator Danaher, "that the forward-looking management of an important industry takes such a progressive step and it is one which ought to find emulation in other industries."

The government is launching rehabilitation programs for servicemen at several universities. Pennsylvania State College, for example, is a speech training center.

"Rehabilitation this time will be total, not partial as in the last war," Dr. Herbert Koepp-Baker, associate professor of speech, states. "The government is planning to make as many servicemen as possible entirely fit to go out and earn their living."

In some of the more severe cases, training will be given in the Army,

Navy and Marine hospitals. But the majority of the men will be discharged from hospitals after their wounds have healed and will be sent to rehabilitation centers.

An interesting case turned over to the Cleveland office of the USES is that of a 40-year-old man who served in the merchant marine for 18 years. He suffered a nervous breakdown when his ship was shelled in a Russian seaport. Discharged recently from a merchant marine hospital as cured he is still suffering from shell shock, officials point out. Rehabilitation in a sheltered workship is necessary to restore him.

A 26-year-old victim of the North African battlefront suffered blocked heart condition resulting from a gunshot wound. He has been placed in industry as a guard at a large defense plant. Malaria undermined the health of a veteran who fought in Dutch Guiana. It left him in a highly nervous condition, but he has been sufficiently rehabilitated to be placed in a shop as a precision grinder on tool production.

Industry Lending a Hand

W. C. Dunn, president, Ohio Crankshaft Co., Cleveland, recently said "we want to do all we can to rehire servicemen who may have been wounded and we will make every effort to find them work which they can do."

A plan is now in effect whereby the Ohio company communicates with the armed services relative to certain individuals on how their cases can be treated best from an industrial point of view.

One interesting case is that of a former machine tool operator who returned to the company after being wounded in action. This sailor came back to his old job with a dislike for his former lathe. The personnel department is testing him at a number of jobs to determine which gives him the greatest satisfaction.

Walking through the Thompson Products Co. plant in Cleveland, one can see a clean-cut looking youngster of not more than 20, bent over a drafting board. He is a shell shock victim from Guadalcanal but has been sufficiently rehabilitated to return to his old position. Still another victim of shell shock and malaria has been placed in the responsible post of assistant director of activities and is giving an excellent performance in the job.

"The forthcoming postwar period will not only be concerned with the problem of providing jobs as ordinary employment, but industrial management and facilities will have to be directed to the matter of making special employment adjustments for disabled war veterans who must have some means of making a livelihood," Fred C. Crawford, president, National Association of Manufacturers and Thompson Products Inc., Cleveland, states.

"The rehabilitation of veterans is already a standard part of industrial programs which are currently meeting the problem as disabled servicemen, unfit for active duty but still anxious to play a part on the production front, trickle back from the various war fronts."

Mr. Crawford said Thompson Products Inc., in line with its invested policy of interest in employe welfare, is leading off research planning for postwar jobs with an intensive study of individual cases of returned veterans who are employed, or applying for employment, at its plants.

The management, he added, is uniting the thinking-power in all the various phases of production to build up a program of rehabilitation which will make the lot of returning war heroes as true to "the American way of life" as humanly possible—a reward they so justly merit.

This former Marine was wounded during an attack on the Japheld Solomon Islands last year. He was rehabilitated at a Marine hospital and now is employed as a draftsman at the Thompson Products Co., Cleveland. He is typical of hundreds that have undergone special training before being placed into industry

Government officials indicate private, state and industrial establishments will be called upon for aid in rehabilitating the wounded. Typical of private institutions which will play an important role in this work is the Association for the Crippled and Disabled. This rehabilitation center has placed hundreds of handicapped civilians in war jobs since Pearl Harbor. Miss Bell Greve, executive secretary of the organization, has specialized in rehabilitation work for the past 20 years. After the last war she worked for the Red Cross rehabilitating disabled veterans in virtually every European country.

"For complete rehabilitation there must be teamwork of services and united planning," Miss Greve said. "No one service is complete. There first must be adequate physical rehabilitation which includes occupational and physical therapy."

She points out occupational rehabilitation is useless unless preceded by physical rehabilitation.

"Fundamental principle of rehabilitation is the maximum restoration of physical capacity," she declared. "Then there must be an analysis of assets and liabilities of the individual. Too often the mistake has been made of analyzing the liabilities and not the assets."

Miss Greve warns industrialists against placing a disabled veteran in a sinecure. A handicapped person knows that if given the opportunity to work, he can be an asset to the company and not a burden or moral obligation.

Rehabilitation specialists stress industry would be performing a tremendous service to disabled veterans if it took a keen interest in seeing to it that they have the opportunity for complete rehabilitation before being assigned to a job. It has been found that when proper placements are made it is a distinct benefit to the company.

Deshon General Hospital, Butler, Pa., is typical of the many military hospitals scattered across the country which are restoring the disabled veterans for industry. It is crowded with 400 heroes of the global battlefields. Some of these have returned to industrial jobs.

Legislation passed in 1920 placed the disabled of World War I under the jurisdiction of the Federal Board for Vocational Education. Later they were transferred to the jurisdiction of the Veterans' Bureau which provided medical care.

(*Please turn to Page* 149)

MEN of INDUSTRY

Clarence B. Randall, vice president, Inland Steel Co., Chicago, has been made president of Hillside Fluor Spar Mines, Rosiclare, Ill., recently purchased by Inland; **P. D. Block Jr.,** assistant vice president of Inland, vice president; while Inland's secretary, **J. H. Morris,** has been made secretary of the Hillside company and **W. D. Truesdale,** treasurer of Inland, has been made treasurer. **A. J. Cayia,** who is general superintendent of Inland Lime & Stone Co., Manistique, Mich., will serve as manager of operations of the newly-purchased company and Gordon W. Hughes, sales manager, Inland Lime & Stone Co., manager of sales. **H. W. Hurst** of Hillside will continue as general superintendent. **J. C. Hench,** former president of Hillside, has retired to devote full time to other business interests, including presidency of Mid-West Forging & Mfg. Co., Chicago.

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Glenn C. Paxton, former production manager, Morrison Engineering Corp., Cleveland, has been appointed production manager, Industrial Oven Engineering Co., Cleveland. Mr. Paxton has also been associated with the Electric Furnace Co., Salem, O., and McCann-Harrison Corp., Cleveland.

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A. M. Wibel, formerly vice president and director of Ford Motor Co., has become vice president of Nash-Kelvinator Corp., Detroit. **W. F. Armstrong** and **Frank R. Pierce,** vice presidents, Nash-Kelvinator, have resigned.

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Ralph L. Hohnhorst has been appointed Connecticut district representative, machinery division, Austin-Hastings Co. Inc., Cambridge, Mass.

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John S. Gregg has been made district sales manager, Cincinnati sales office, Inland Steel Co., to succeed **Kenneth J. Burns** who has become an executive in the company's plate and shape sales division, Chicago.

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Robert H. Gibb, manager, Allegheny Ludlum Steel Corp.'s Pittsburgh district sales office, has left to accept a commission in the United States Navy. **Max Pischke** will succeed Mr. Gibb with title of acting district manager.

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W. H. Houghton, comptroller, Bendix Aviation Corp., South Bend, Ind., for 14 years and a director since 1942, has been elected treasurer to succeed **E. R. Palmer,** who has resigned as vice president and treasurer, but who will continue as a director and a member of the executive committee. Arthur Raabe, who has been with the Bendix Co. since its inception in 1924, will be in charge of Bendix radio division, Friez instrument division and Norwood and marine divisions.

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E. J. Ellertson, purchasing agent, Caterpillar Tractor Co., Peoria, Ill., has been advanced to the newly-created position of general purchasing agent. Succeeding Mr. Ellertson as purchasing agent is **W. H. Steele,** assistant purchasing agent since 1929.

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W. S. Edsall, formerly manager, Switchgear Division, at Allis-Chalmers Co., Boston Works, has been made manager of a newly combined switchgear and control division of the company's electrical department at Milwaukee.

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Albert V. Beet has been appointed general superintendent, Arrow Head Steel Products Co., Howell, Mich., in full charge of all operations.

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V. H. Peterson, for past two years vice president, Elliott Co., Jeannette, Pa., has been appointed assistant to the president, Baldwin Locomotive Works, Philadelphia.

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Elvin E. Holland has been named first vice president, Star Electric Motor Co. and its affiliate, Star Equipment Corp., Bloomfield, N. J. and general manager of the motor unit; **Ivor C. Peterson,** vice president in charge of sales and **R. J. Gash,** secretary and treasurer. **Raymond E. Hollander** has been named vice president in charge of planning and purchasing for the motor company, while **Fred Eberhard** has been chosen president and general manager of the equipment company.

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L. C. Goad, general manager, General Motors Corp.'s eastern aircraft division, Linden, N. J., has been elected a vice president.

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Edward Shaw Sr., formerly New England sales representative, Producto Machine Co., Bridgeport, Conn., has joined Moore Special Tool Co. Inc., Bridgeport, Conn., as sales manager, in charge of tool-and-die division and also sales of job borers and jig grinders.

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Millard Romaine, following service of two years with WPB, Washington, and Wright Field, Dayton, O., has returned to Cincinnati Milling Machine Co., Cincinnati, to assume his new duties as assistant to the president. Mr. Romaine was formerly sales manager of the company. **Lester F. Nenninger,** engineering department head, has been named works manager, succeeding **W. Peaslee** who recently retired. **Swan E. Bergstrom,** formerly manager of the company's Detroit office, and recently assistant sales manager, has been appointed sales manager.

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James M. Conway, formerly vice president in charge of purchases, Bishop

E. J. ELLERTSON

V. H. PETERSON

D. K. BALLMAN

Who has been named head of the newly organized service and development division of Dow Chemical Co., Midland, Mich., as announced in STEEL, June 7, p. 92

Gutta Percha Co., New York, has been elected president to succeed the late **Henry D. Reed.**

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Richard D. La Fond has been made director of public relations, Sperry Products Inc., Hoboken, N. J. Prior to his association with the Sperry company, Mr. La Fond was sales promotion manager, Dresser Mfg. Co., Bradford, Pa., and before that was connected with the industrial advertising section, General Electric Co., Schenectady, N. Y.

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Dr. Roger H. Lueck, director of research, American Can Co., Maywood, Ill., has been awarded the honorary degree of doctor of science by Carroll College, Waukesha, Wis.

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M. J. Matthews, associated with Cadillac Motor Car division, Detroit, since 1910, has been appointed superintendent, Sheet Metal Division, succeeding **A. A. Weidman,** recently transferred to Detroit Diesel Division, General Motors Corp.

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John E. Wells, formerly advertising manager of Ex-Cell-O-Corp., Detroit, and more recently associated with Manning, Maxwell & Moore Inc., Muskegon, Mich., has been appointed advertising director, manufacturing subsidiaries of Aviation Corp. with headquarters in Detroit.

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Harrison I. Dixon, formerly sales manager, Park Chemical Co., Detroit, is now associated with the H. H. Harris Engineering Service Co., with offices in Boston, Detroit and Chicago.

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Daniel C. Green has been named president, Cleveland Pneumatic Tool Co. and its subsidiary, Cleveland Pneumatic Aerol Inc., Cleveland. As chairman of the board of directors, Mr. Green had been the chief executive officer of the company since March, 1942. He replaces **John De Mooy,** who retired after 42 years with the company. **John S. Clark** has been appointed treasurer, and **J. W. Roberts,** assistant treasurer.

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H. B. Shepherd has been appointed district manager of sales, Washington office, Jones & Laughlin Steel Corp., to succeed **J. B. DeWolf** who has resigned.

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Clyde Vandeberg, deputy of OWI and chairman of the government's interagency production information committee, has resigned to become general manager, Aircraft War Production Council East Coast Inc., with headquarters in New York. Mr. Vandeburg will continue to serve OWI in a consulting capacity on labor and management relations in the industrial field. Prior to 1941 he was assistant to the president in charge of industrial relations for Packard Motor Car Co., Detroit.

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Lee Schoenfeldt, former economist and manager of commercial research, General Electric Co., Schenectady, N. Y., has joined the radio division of Bendix Aviation Corp., New York, as assistant marketing director.

W. P. DRAKE

William P. Drake, recently appointed manager of sales, Pennsylvania Salt Mfg. Co., Philadelphia, has been placed in charge of the company's sales of acid and alkali-resistant cements and chlorinated organic chemicals, in addition to his former duties as manager, Pennsalt Cleaner division. Assisting Mr. Drake are **Albert H. Clem** and **Joseph J. Duffy,** formerly of the Detroit and Rochester territories, respectively. **J. S. Dimon,** formerly local representative in the Philadelphia area, has been given charge of sales and service in the transportation field, while **W. J. Hennessy,** with headquarters in Pittsburgh, has been given charge of technical service to the steel industry.

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Palmer Nichols has been elected president, Bendix Aviation Ltd., North Hollywood, Calif. **Mel M. Burns** continues as vice president and assistant general manager.

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W. A. Mann has been appointed assistant manager, industrial division, General Electric's central district, Chicago. Mr. Mann joined the company's electric turbine department at Schenectady works in 1923.

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John W. Hart has been elected executive vice president, McCray Refrigerator Co., Kendallville, Ind. Mr. Hart succeeds **Paul W. Miller,** who has been elected chairman of the board.

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A. Howard Fuller, formerly vice president and director of production, Fuller Brush Co., Hartford, Conn., has been elected president to succeed **Alfred C. Fuller,** founder of the company, who has been named chairman of the board of directors. Alfred C. Fuller is also president of Connecticut Manufacturers Association.

JAMES F. STRNAD

James F. Strnad, president, Lempco Products Inc., Bedford, O., has been made president of the Evans Reamer & Machine Co., Chicago, formerly known as the Evans Flexible Reamer Co. and recently purchased by Lempco. **O. T. Hillshafer,** former Lempco assistant sales manager, has been promoted to executive vice president in charge of sales of Evans Reamer & Machine Co., while **John Y. Blazek,** general manager of Lempco has been named treasurer and **Herbert A. Spring** has been made secretary.

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Harold E. Hall has been elected president, Metals Disintegrating Co. Inc., Elizabeth, N. J. He has been general manager the past six years.

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Thomas J. Connors, for 20 years special representative, steel division, The Stanley Works, Bridgeport, Conn., has been appointed New York district sales manager.

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E. G. deCoriolis, research director, Surface Combustion Corp., Toledo, O., has been given honorable mention by the National Metal Trades Association at its annual dinner recently at the Palmer House, Chicago, in recognition of his work in development of the RX gas generator, an outstanding contribution in the

heat treating field for savings in critical alloys.

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Shelby G. Fell, superintendent of cost and accounting, Kearny, N. J. works, Western Electric Co., has been promoted to assistant controller of manufacture at general headquarters, New York. Succeeding Mr. Fell in his former post are **Irving M. Baker** and **John M. Campbell.**

GEORGE JOHNSTONE JR.

George Johnstone Jr., formerly assistant foundry superintendent at Grove City, Pa. plant, Cooper-Bessemer Corp., has been named foundry superintendent.

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J. W. St. Clair, vice president, Hajoca Corp., Philadelphia, has been elected secretary, Philadelphia Control of the Controllers Institute of America. Charles L. Jones, assistant treasurer, Alan Wood Steel Co., Conshohocken, Pa., was re-elected a director.

FRED H. JOHNSON

Fred H. Johnson has been appointed assistant chief engineer, Pittsburgh district, Carnegie-Illinois Steel Corp. In charge of the defense engineering staff for two years, Mr. Johnson came to Carnegie-Illinois in 1940, having previously served with Interlake Iron Corp., Chicago, from 1926.

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Dr. William E. Wickenden, president, Case School of Applied Science, has been appointed a public member of the wage-hour committee for the stone, clay, glass and allied industries.

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B. L. Whelan has been named acting general manager, Sikorsky Aircraft division, United Aircraft Corp., East Hartford, Conn., to succeed **J. R. Miller** who has been granted a leave of absence because of ill health.

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James C. Daley, treasurer, Jefferson Electric Co., Chicago, has been elected president and treasurer to succeed **J. A. Bennan,** founder of the company, who has become chairman. **Alfred E. Treganza,** vice president, was named executive vice president.

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Harry J. Wines, general New York sales manager, Frigidaire division, General Motors Corp. for past eight years, has been appointed to sales executive staff of Zenith Radio Corp., Chicago.

OBITUARIES . . .

George Washington Connors Sr., 77, board chairman, Connors Steel Co., Birmingham, Ala., died June 5 in that city. Mr. Connors established the Connors-Weyman Steel Co. at Helena, Ala., in 1908 and in 1915 organized the Connors Steel Co. He served as general manager until 1937 when he was made chairman of the board.

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Harry P. McCann, 63, head of McCann Furnace Co., Cleveland, died June 7 in that city.

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Edward H. Bardes, 76, founder of the E. H. Bardes Range & Foundry Co., Cincinnati, died recently in that city.

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William L. Krodel, 72, founder, general manager and secretary, Waterbury Brass Foundry, died June 3 at Millville, Conn.

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John J. Holub, 66, for the past 15 years factory superintendent, Excelsior Steel Furnace Co., Chicago, died June 2 in that city. He had been associated with the company 50 years.

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Otto A. Frederickson, 50, chief engineer, National Electric Products Co., Pittsburgh, died June 5 in Orange, N. J.

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William H. Stratton, 76, former manager, export department, American Bridge Co., died June 4 at Ridgewood, N. J. Mr. Stratton was general manager, Berlin Iron Bridge Co., Berlin, Conn., when that firm was taken into the United States Steel Corp.

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John W. Callaghan, 71, president and treasurer, White Wire Works Co., Rochester, N. Y., died June 3 in that city.

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William A. Sinnott, 44, assistant to division superintendent, steel production, in charge of personnel, open hearth department, South Works, Carnegie-Illinois Steel Corp., Chicago, died June 1 in that city. He had been employed at South Works since 1917.

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Dr. Philip H. Kreuscher, 59, chief surgeon, Chicago district, Carnegie-Illinois Steel Corp. from 1936 until his retirement in February this year, died June 1 in Chicago.

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R. H. Chadwick, assistant to the manager in charge of engineering, Fort Wayne Works, General Electric Co., died May 29.

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Harry S. Hitchcock, 75, president and general manager, Apex Steel Corp., Los Angeles, died May 30. He was one of the early pioneers in the iron and steel industry of Southern California, having formerly been connected with the Baker Iron Works Plant, Los Angeles.

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Alec C. Gerrard, 59, founder of Gerrard Wire Tying Co., Chicago, now a subsidiary of United States Steel Corp. and inventor of several wire tying devices, died June 5 in San Francisco. He was also associated with A. J. Gerrard & Co., Chicago.

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Adelbert Emmons Bronson, vice president and director, Dill Mfg. Co., Cleveland, died May 26 in that city.

Action Expected Soon on Move To Build Critical Metal Supply

Directors of A.I.M.M.E. likely to take up for final consideration resolution aimed at advancing proposed accumulations of essential materials after the war

BEHIND a resolution likely to come up for final action this week by directors of the American Institute of Mining and Metallurgical Engineers is a strong conviction that a reserve of critical metals and minerals should be set up after the war and that something should be done about it now and not after the war is over.

The reserve, it is contended, should be adequate to meet or at least cushion future national emergency needs and to preclude postwar dumping of heavy excess stocks of metals and minerals. But for the plan to go through, it is considered important for Congress to act while recent difficulties in getting strategic materials are still fresh in mind and before the matter becomes submerged in a wide diversity of problems likely to arise after the termination of the war.

Back in 1918 Bernard Baruch proposed such action before the end of the first World War,, but nothing came of it—at least not until as late as 1940, when stockpiling was finally authorized by Congress, and with war looming on the horizon. And even then had it not been for the foresightedness of industrialists in laying in substantial stocks, it might have been too late. As it was, the situation for a while appeared acute.

Proposes Congressional Action

This was emphasized earlier in the year at the Mining and Metallurgical Engineers' annual meeting by R. C. Allen, Oglebay Norton & Co., Cleveland and past president of the institute, who proposed that members start formulating a policy for submission to Congress that it, in turn, might enact a law providing for such reserves. Subsequently, a resolution was drawn up advocating the accumulation by the government of "adequate reserve stockpiles of critical minerals during the period of ten years immediately following the termination of the present war." The resolution over recent weeks has been put before various sectional groups of the organization and is now up for final action by the directors June 17. It is considered probable that the resolution will be passed, with few, if any changes.

As now drafted, the resolution enunciates only a broad policy; it deliberately avoids various details, for the formulation under a comprehensive stockpiling program naturally can be accomplished only after the clarification of various important questions. A. B. Parsons, commenting editorially in a recent issue of the institute's publication, *Mining and Metallurgy*, lists some of the more fundamental questions, which must first be solved:

(1) What metals or ores should be included?

(2) To what state, if any, should ores be processed: should manganese be stocked in the form of ore or as ferromanganese; should copper be stocked as concentrate, as blister, or refined wire bars?

(3) How much of each critical material should be accumulated?

(4) Should domestic producers be subsidized by premium prices when they are unable to compete with producers from foreign countries; and, if so, by how much?

(5) How rapidly should the determined quantity be acquired?

What changes there will be in the weapons and technique of waging future wars, or precisely what the advances will be in metallurgy and engineering no one can foretell; nevertheless, he believes, that with the co-operation of Army and Navy officials, civilian technologists and engineers, economists, and statesmen, a useful program can be developed.

Clearly it is impossible at the moment to estimate how much of a surplus will be on hand at the close of this war. Figures developed at the end of the first World War scarcely provide an index, for the reason that present hostilities are on a much vaster scale and are so much more highly mechanized.

As indicated above, there are various uncertain factors in connection with the whole problem. For instance, what would be the influences of lend-lease and reciprocal trade agreements, and to what extent will it be necessary to cushion the effect of the postwar transformation for domestic operators? These and other phases will have to come in for study.

Huge Reserve Required

It has been roughly estimated that a reserve with a minimum value of $3 billion would be adequate. Much of this valuation, of course, would be represented by materials on hand, and undoubtedly, too, by materials which would be brought in from abroad in exchange for food and manufactured products. Consequently, any program set up on this basis would not require new appropriations for anything like the amount.

Discussing the desirability for main-

POTENTIAL DOOM FOR ENEMY BATTLESHIP

ARMOR-PIERCING bomb comes off the press at a Bethlehem Steel Co. plant while the makings of another goes on. One bomb of this size is capable of sinking or crippling a heavy cruiser or battleship

taining a stockpile of domestic as well as foreign minerals, Mr. Allen recently pointed out that during the past third of the century the world has used more minerals than in all previous time and that exhaustion of many of this country's great mineral deposits is proceeding at an appalling rate. For instance, shipments of iron ore of good grade from the Lake Superior district cannot be maintained at the present rate for more than six or seven years, he said. Hence, he believed that even domestic iron ore should be stockpiled.

In its proposed resolution, the mining institute offers to provide Congress, without cost, disinterested and expert engineers and technological advice regarding needs and sources as may be necessary; and should the resolution be approved by the directors in its present form, a copy will be sent to the President and to each member of the Senate and House of Representatives.

Far from beating the drums of war in making this proposal, proponents of the stockpiling program believe that such reserves, at worst, would only contribute to an early victory in the next war and might defer such a conflict indefinitely.

Industry To Face Gigantic Task Converting from War to Peace

ASSUMING the country will have a sound economic system, much can be achieved after the war is over in putting men to work, Lammot du Pont, chairman, E. I. du Pont de Nemours & Co., Wilmington, declared recently at the annual meeting of the Manufacturing Chemists Association, Hotel Waldorf-Astoria, New York.

To obtain the best results, he declared, certain fundamentals will have to be respected, for instance (1) sound money, based preferably on the gold standard; (2) taxes at such a level as to give industry the incentive to expand; and (3) government abstinence from competing with private business.

He revealed that his own company's postwar planning group has made a survey which "indicates that the new projects which Du Pont will be ready to launch when the war is over, together with increased outlets for existing products, will give rise to an all-time high in peacetime employment by the company. Such a result, of course, assumes that the country will have a sound economic system and that there will be no seriously abnormal man-made business conditions or difficulties which cannot be foreseen now."

Mr. Du Pont asserted that regional and national planning conferences are educational and serve a useful purpose in giving incentive, but emphasized that "when problems are actually tackled, each company or corporation must consider its own needs and work out each solution, not selfishly but with consideration for the greatest good for the greatest number."

He stressed the magnitude of the problem involved in absorbing millions of demobilized fighting men and other millions of workers from closed-down war plants. He declared that although the United States would have the greatest productive capacity in its history, the task of swinging this capacity from the channels of war to those of peace would be fully as titanic as was the conversion of a peaceful nation into the "arsenal of democracy".

Huge Peacetime Demand For Goods Is Predicted

By the end of 1944 demand for power for war production will be decreasing, Charles W. Kellogg Jr., president, Edison Electric Institute, told 500 members of the organization at its annual meeting in New York recently.

He pointed out that the combined electric generating capacity of the nation's power systems, both private and public, has increased by 6,500,000 kilowatts since June, 1940, to a present level of some 47,500,000 kilowatts—more than the combined installed capacities of the Axis nations.

Hugh C. Thuerk, chairman, institute's postwar planning committee, asserted that from the present outlook the deferred demands for both consumer and durable goods in this country will be relatively much greater than after the last war.

Economist Declares War's Maladjustments a Problem

The fourth bulletin of a series on postwar readjustments titled *Maladjustments in the Postwar* has been released by the Chamber of Commerce of the United States.

Dr. Emerson P. Schmidt, economist and secretary of the group's committee on Economic Policy, is the author of the latest bulletin. The booklet discusses the maladjusted economy as a result of war. It points out that some industries and some workmen are adversely affected while others are greatly stimulated. It regards the price spreads and derangements resulting from war as constituting a barrier to active business—the exchange of goods and services.

Suggests Policing World's Mineral Resources

Formation of a postwar international policing body to enforce peace by controlling the world's mineral resources was proposed recently by Charles Kenneth Leith, head, Metals and Minerals Branch, Office of Production Research and Development, War Production Board. This program should permit nations to expand industrially, but prevent them from rearming for war.

He spoke at the annual commencement of the graduate school of Stevens Institute of Technology, Hoboken, N. J., at which the college conferred upon him the honorary degree of Doctor of Science and on George Bucher, president, Westinghouse Electric & Mfg. Co., Pittsburgh, the honorary degree of Electrical Engineer.

Dr. Leith declared the United Nations were not only keeping even with the Axis but in some cases were well ahead in the technology of metal production and use.

"We are now in position where our vastly superior weight of metal will begin to count," he assertetd. He advocated the postwar accumulation of stockpiles of strategic minerals and the study of the technology of warfare.

National Planning Group Seeks Realistic Program

The business, labor and agriculture committees of the National Planning Association declared in a joint statement recently that "we believe what happens to this country after the fighting is over is of personal concern to every American."

The committees, organized by the association, said that their function is not so much to create new plans as to seek out the best of postwar planning from other sources. They agree that the war will have been lost if masses of workers are idle. They seek to face postwar planning realistically and prepare against unemployment during the reconversion period.

The committees also agree that the basis of America's postwar economy should be private enterprise but that private enterprise should adjust itself to a changing world.

Electric Metal Makers Consider High Quality Steel Production Problems

MAINTENANCE of the high-quality of electric furnace steel in the face of lower quality raw materials and unskilled help was given chief attention at the eleventh annual meeting of the Electric Metal Makers Guild at Canton, O., June 4 and 5.

James Sweitzer, Sivyer Steel Casting Co., Milwaukee, was elected president to succeed Harry F. Walther, Timken Roller Bearing Co., Canton, O. Mr. Sweitzer has been vice president of the guild for the past year. In that position he is succeeded by Alex C. Texter, Atlas Steels, Ltd., Welland, Ont. John E. Arthur, Crucible Steel Co. of America, Pittsburgh, was re-elected secretary-treasurer.

President Walther in his welcoming address emphasized the importance of the job done by electric furnace steel, pointing out that capacity operations must be maintained in spite of increasing difficulties with respect to alloys, scrap and manpower.

Hardenability Tests

Guest speaker at the opening session was Walter G. Hildorf, chief metallurgical engineer, Timken Roller Bearing Co. Mr. Hildorf summarized wartime developments in alloy steel metallurgy and pointed out the increasing value of hardenability tests as a criterion of the value of a steel. Buyers of alloy steels in the postwar period will probably pay little attention to the alloy content, he said, but will base their decisions on the hardenability as an indicator of what the steel will do.

Technical sessions were split into two groups—one of ingot manufacturers under the chairmanship of Edward J. Chelius, Duquesne works, Carnegie-Illinois Steel Corp., and the other section composed of steel foundrymen under the chairmanship of Martin T. McDonough, National Malleable & Steel Castings Co., Sharon, Pa.

Chief subjects covered at the ingot section were on charging practice, hot metal preparation, duplexing of steel, refractory furnace linings and scrap melting. The foundry section discussed heat treatment, applications of low-alloy steel castings, use of transformers and reactors in foundry operations, and foundry metal practices.

Col. Steven Conner, Watertown Arsenal and a member of the guild, discussed the Army gun program and the part industry has played in it. Aside from a continued trend to larger caliber, according to Colonel Conner, the Army gun program is pretty well settled. No further changes in metallurgy can be expected in view of the fact that so far in this war no American gun has failed in the hands of troops.

Some of the problems of the industry which must be faced before the war is over, as well as some postwar problems, were discussed by Harry W. McQuaid, principal industrial specialist, Iron and Steel Division, War Production Board. According to Mr. McQuaid, only the toughest steel jobs are now being given to the electric furnace manufacturers for production, but there are so many of these, that unless all units are pushed to capacity, we will be unable to meet production schedules.

James E. Lewis, Industrial Salvage Section, War Production Board, outlined the work of this unit and gave some indication of scrap supplies which can be expected during the next few months.

At the annual dinner Walter M. Farnsworth, Republic Steel Corp., acted as toastmaster and introduced Lewis H. Creighton, chief, Alloy Steel Branch, Iron and Steel Division, WPB. Mr. Creighton gave a broad general picture of the alloy steel situation, how the supply of critical alloys is expected to balance together with scrap to provide sufficient melting stock for the expanded electric furnace program, plus the open hearth capacity for melting alloy steels.

Automotive Engineers Discuss War Materiel Problems at Meeting

CAST IRON and steel are satisfactory substitutes for aluminum in the manufacture of brake cylinder pistons, J. F. Bachman, Chrysler Corp., told the war materiel meeting of the Society of Automotive Engineers at the Book-Cadillac hotel, Detroit, last week.

Tests of all other materials, Mr. Bachman told the group, were found unsatisfactory. Steel requires rigid inspection for nicks and burrs and very careful handling before installation, he added. Durez plastic with hardened steel insert was found a possibility but more experience is desired.

Brig. Gen. John K. Christmas' statement that "dust is as real an enemy to our mechanized war equipment as the enemy themselves" provoked a discussion of "Dust Problems In Military Vehicle Operations" by L. F. Overholt, International Harvester Co.

Vital Parts Protected

Mr. Overholt said that the tractor industry experience has proved that all vital parts of the machine must be protected against clogging or abrasion by dirt. Lessons obtained the hard way, he added, have taught designing and development engineers that the dust problem is not a stepchild to be pushed around but a real enemy that cannot be defeated by halfway measures.

Col. E. S. Van Deusen, Ordnance Department, Tank-Automotive center, presented a paper titled "Lessons Learned From World War II About Designing For Accessibility." He said that relative accessibility is measured in units of time by our troops in the field—and in the theatre of operations, time is measured in flesh and blood. Thus, a physical relationship of units and assemblies such as may enable maximum, unhindered, manual adjustment on the one hand, and minimum special tool work on the other is to be classed as nothing less than a military objective in itself. He proposed that industry compromise just a bit more in favor of accessibility.

Much Progress Made

Rear Admiral Ralph E. Davison, Bureau of Aeronautics, U. S. Navy, told the group that much progress has been made. Navy airplanes are now being produced in quantity on assembly lines that are becoming more efficient and are at the same time flexible. The trained engineers of the Navy are ready to help in any way that is within their power, he added.

"Shot Blasting to Increase Fatigue Resistance" was the subject of a paper by J. O. Almen, Research Laboratories division, General Motors Corp. Mr. Almen declared that while great strides have been made in most phases of engineering and metallurgy it is doubtful that in dynamically loaded parts we are getting more net work from our metals today than was obtainable 25 years ago. Although no super strength alloys have been discovered, he added, and no such discoveries seem to be imminent, there is much that can be done to materially increase the fatigue strength of many machine parts made from ordinary structural materials.

Co-workers' Jibes Shame Offenders

Steel castings company official describes corrective measures his firm found successful

ABSENTEEISM continues one of the most difficult problems confronting industry despite considerable attention to the problem in recent months.

Plant and industry surveys have developed much information on causes and effects, and some progress has been made in effecting a program for combating the evil. Much remains to be done as indicated by a recent survey by the National Association of Manufacturers.

This survey (STEEL, May 24) showed average absenteeism in 25 major war plants increased 56 per cent since the start of the war effort. Present percentage of absenteeism was found to be 5.42 per cent, compared with 3.48 before the outbreak of hostilities.

Chief causes were found to be sickness, accidents, housing and transportation problems, high earnings, inexperience in regular employment and irresponsibility.

That the problem is not impossible of solution is the opinion expressed by most industrialists. The manufacturers' association, in fact, advances 30 suggested steps whereby management can alleviate the problem. In many instances, however, it is recognized that conditions peculiar to a particular plant or area must enter into the formulating of any plan or program designed to correct the local situation.

In this latter connection John Sonnenfeld, vice president and works manager, Keokuk Steel Casting Co., Keokuk, Iowa, in a letter to the editor of STEEL, details his company's experience in handling the problem which shows how a psychological approach can be utilized successfully as a corrective.

"'Patting-on-the-back' methods have failed from the start," writes Mr. Sonnenfeld. "Disciplinary measures are not advisable due to possible repercussions coming often from delicate cases where it is difficult to determine the real cause of a man's absence from work.

"The highest percentage of absenteeism develops immediately after the worker receives his pay, which in our case here is on the nightshift Friday, then on Saturday and some on Monday, and despite laying such men off for from two to six days, no improvement resulted. On the contrary, these men got sour and got a lot of sympathy from their co-workers.

Company Changes Pay Day

"As stated above, we are paying our men on Friday. The night men can have their checks beginning 10 a. m. Friday which gives them time to do their weekly shopping in daytime.

"To break the habitual absentees from their practice of staying away either on Friday or on Saturday, I decided to change the pay day from Friday to Saturday and notified the union committeemen, who voiced their approval and promised to co-operate.

"It should be understood the unions do not approve of wildcat absenteeism and, properly handled, will co-operate in combatting this evil."

Notices of the change were posted on a Tuesday.

The reaction started to set in on Thursday when a number of steady workers came to ask if they couldn't get paid as heretofore on Friday and why should they be penalized for the sins of a few reckless co-workers, etc.

"By Friday morning the psychological cycle was complete and one of the most astounding reactions had crystallized: *The condemnation and rebuff of absentees by their own co-workers.*

"The rest was easy. The payroll department had orders from the outset to have the paychecks ready as usual on Friday morning and the paymaster to hand the checks out to all except to the habitual absentees, whose checks were to be delivered to me and the delinquents to call for their checks at my office.

"So when the paymaster started his rounds of paying off he naturally skipped the culprits whereupon a big rumpus all over the departments started. Jibing, poking fun and generally provoking the checkless men never ceased until the end of the dayshift, when these justly disciplined men singly charged into my office ready to strike back.

"I was prepared for them, however, and as soon as one of them stepped in, I handed him his check, asking if that was what he wanted. I told him also to look at the figures on his check and asked if he did not realize that his check should have been for a much larger amount, had he not been foolish enough to loaf rather than work and do his share towards the war effort like the rest of us."

Following this, the company had no unwarranted absenteeism on Friday, Saturday, or Monday.

Keokuk Steel Casting operates an open shop, has a union agreement, employs about 240 men.

"The trigger-man didn't come in today"

Work Shirkers Given "Tall" Harpooning by Cartoonists

Absenteeism is being given some "tall" harpooning by American cartoonists at an exposition of more than 200 cartoons recently opened at 335 Fifth avenue, New York. One of the cartoons on display appears on this page.

The display is the work of members of the American Society of Magazine Cartoonists and is being held under the sponsorship of the United States Production Information Committee, comprised of the War Production Board, the War Manpower Commission, the Maritime Commission, the Office of War Information and the Army and Navy.

Shortly 25 of the cartoons will be selected by a board of seven judges chosen from representatives of the war agencies making up the United States Production Committee.

Lieut. Edward Schmidt, a wounded veteran of Guadalcanal, presents token pins, left, to Mrs. Rose Treutinger, a machine shop employe at Ampco Metal Inc., Milwaukee. Looking on is C. J. Zaiser, company president

At right, Robert H. Luckenbach, left, safety director of the Edward G. Budd Mfg. Co., Philadelphia, receives congratulations and a certificate of merit from M. L. Wurman, chairman, industrial section of Philadelphia Safety Council. The Budd company won the first quarter inter-plant safety contest for having achieved the greatest decrease in accident frequency rates among large metal products manufacturers

★

Republic Drill & Tool Co., Chicago, manufacturer of high-speed twist drills, received the "E" burgee at recent ceremonies, below, the first in which the award was made to an organization primarily designed for and operated by women. Employe representatives hold the flag. At left are Col. W. H. McCarty and E. F. Reinhart, president

Five Production Pennants Awarded by Army-Navy

Five Army-Navy production awards for excellence in performance of war work were announced last week by Under Secretary of War Robert P. Patterson and Under Secretary of Navy James V. Forrestal. They are:

Eagle Precision Tool & Die Co., Long Island City, N. Y.

Fletcher General Hospital Construction Project, Cambridge, O.

Hawaiian Air Depot, Hickam Field, Territory of Hawaii.

Liberal Air Field Construction Project, Liberal, Kan.

Ozark Ordnance Works Construction Project, El Dorado, Ark.

Operating Expenses Absorb 96 Cents of Steel Sales Dollar

PAYROLLS, taxes, raw materials, depreciation and depletion and other operating expenses absorbed 96 cents of the steel industry's sales dollar in 1942. This was 2½ cents more than in 1941 and 5 cents more than in the last peacetime year of 1940, according to the American Iron and Steel Institute.

Of the 4 cents remaining after paying operating costs, 2½ cents were paid out in dividends, ½-cent in bond interest, and 1 cent was added to the companies' surplus as a reserve for future needs.

In 1941, costs of operation consumed 93½ cents of each sales dollar. Dividends represented 3 cents, ½ cent was accounted for by interest, while 3 cents were left in the business as an addition to surplus.

In 1940, the proportion distributed to bondholders was twice as much as in 1942. One and one-half cents more of each sales dollar were paid out in dividends that year than in 1942, while 3 cents more of each sales dollar were added to surplus.

The rise in operating expenses evident during 1941 continued in 1942. Payrolls increased from 33 cents in every sales dollar to 36½ cents. Taxes rose from 11½ cents to 12½ cents per sales dollar, more than three times the portion consumed by taxes in 1929 and almost double the figure for 1940 when only 6½ cents in every sales dollar were absorbed by government.

Largest percentage increase in costs last year was in payrolls, which took 10 per cent more of each sales dollar in 1942 than in 1941. Taxes ranked second, increasing 9 per cent over the year before.

Percentage of each sales dollar accounted for by interest and dividend payments to investors and by additions to surplus was nearly 40 per cent less last year than in 1941.

Costs of materials, freight charges and other expenses reflecting indirect labor costs took 42½ cents of each sales dollar in 1942, two cents less than in the preceding year.

Armco's '42 Sales Soar; Net Declines 31 Per Cent

Record volume for the year 1942 is reported by American Rolling Mill Co., whose net sales rose to a new high of $180,978,867, a gain of $11,800,628 over preceding year. In sharp contrast, however, was the decrease in net earnings which, according to Charles R. Hook, president, were reduced to $7,780,988 by the largest tax bill in Armco's history, higher labor costs and refund of $2,500,000 as a result of contract renegotiation. Net for 1942 was $11,288,475, or $3.21 a common share, compared with $2.01 a share last year.

Most of the major construction work started by the company in 1940 was completed in 1942 and is producing steel, Mr. Hook said. Expansion embraced modernization of the Ashland, Ky., division sheet mill, improvements at other divisions and the new plant of Sheffield Steel Corp. of Texas.

Armco International Corp., export dision of American Rolling Mill Co., has contracted to build and manage a fully integrated steel plant at Monclava, Coahuila, Mexico, by Altos Hornos de Mexico, S. A., a Mexican corporation.

First quarter operations of the company resulted in net earnings of $1,535,205, equal to 36 cents a share on common stock, against $1,731,635, or 43 cents a share, in the 1942 period.

Rustless Iron & Steel Corp.

Report of Rustless Iron & Steel Corp. for quarter ended March 31, 1943, shows net profit as $822,680, equal to 86 cents a common share, compared with net of $576,011, or 60 cents a share, in like quarter last year.

Superior Steel Corp.

Superior Steel Corp.'s report for quarter ended March 31 shows net profit as $151,014, equal to $1.33 per share, compared with $121,786, or $1.07 per share, for corresponding three months last year.

Steel Payrolls, Wages At New Peak in April

Payrolls of the steel industry in April set a new record for a 30-day month, totaling $133,275,000, the American Iron and Steel Institute reports. The April total came close to equaling the record of $136,813,000 paid out in March, a longer month, and was substantially above the April, 1942, total of $118,568,000.

Employment in the industry declined during April, apparently reflecting lengthening of the average work week. Although total number of hours worked during April set a new peak for a 30-day month, the number of employes in April totaled 634,000, against 637,000 in March and 654,000 in April, 1942. Average work week in April was 42.5 hours per week, unchanged from March but higher than the 39.7 hours per week in April, 1942.

Average hourly earnings increased to a new peak of $1.112 per hour in April, compared with $1.103 in March and $1.004 in April last year.

ACTIVITIES . . .

Sunlight Electrical and Packard Electric divisions of the General Motors Corp., Warren, O., will be combined July 1. New division will be known as Packard Electric division with B. N. MacGregor, general manager of the new division. J. B. Estabrook, general manager of Sunlight Electrical, will be special assistant to Mr. MacGregor.

—o—

Stewart-Warner Corp., Chicago, has leased for five years the twentieth floor of the Builders building, 228 N. LaSalle street, and will move its executive offices from 1828 W. Diversey Parkway about July 1.

—o—

Lempco Products Inc., Bedford, O., has purchased the Evans Flexible Reamer Co., Chicago, James F. Strnad, president of Lempco, announces. The name of the company will be changed to Evans Reamer & Machine Co.

—o—

Hallmark Laboratories has been established in Corry, Pa., as an industrial research laboratory. The company plans to develop manufacturing possibilities in salvageable residue. Research in textiles and coal also is planned.

—o—

The Grobet File Co. of America, importers of precision Swiss files and manufacturers of rotary files, has more than doubled factory area of its New York plant at 421 Canal street.

—o—

Bellows Division, Cook Electric Co., has opened a new plant at 909 Diversey Parkway, Chicago. The plant has a modern testing laboratory with the newest facilities for altitude tests for aircraft work.

—o—

The Ridge Tool Company, Elyria, O., recently moved from its original factory site at North Ridgeville, O., into completely remodeled and modernized plant and offices in Elyria.

—o—

American Pipe & Construction Co., Los Angeles, manufacturers of corrosion resistant thermoplastic coatings, announces appointment of Gunite & Waterproofing Ltd., Montreal, Canada, as Canadian distributors for Amercoat.

THE BUSINESS TREND

Lend-Lease Accounts for 60% of Export Trade

IN the two-year period since the passage of the Lend-Lease act, the United States has exported to other United Nations a vast quantity of war materials and equipment aggregating $7,105,000,000. Of this sum munitions represent almost half, or $3.4 billions, agricultural products over $1.6 billions and industrial items close to $2 billions.

Both volume and rate of shipments have increased substantially since mid-1942 in anticipation of extension of the fighting fronts to western Europe and consequent development of civilian supply requirements for liberated areas. This double role is expected to add immeasurably to the scope of lend-lease operations. The trend is indicated by the report for March of this year when total exports under the act reached $712,000,000, the highest on record, 20 per cent more than in any previous month and over twice as much as in the corresponding month a year ago.

1942 Volume Near World War I Peak

Lend-lease shipments for 1942 amounted to 60 per cent of total exports for that year. Total exports were $7,823,000,000; lend-lease shipments were $4,668,000,000. Last year's lend-lease shipments totaled only slightly less than all exports during peak year of World War I.

Effects of war on export and import activity in 1942 are shown on the accompanying chart. In 1937, when peacetime exports totaled $3,349,000,000, the United Kingdom, our largest present customer, took only 16.4 per cent of United States exports, while in 1942 her share had grown to 30.2 per cent. Canada's requirements increased only 2 per cent to 17.5 per cent in the interval. Latin America in 1937 took 19.1 per cent of total shipments, but in 1942 this amount was reduced to 10.7 per cent. Exports to the Far East and Australia and New Zealand were somewhat lower in the first instance and slightly higher in the latter. The most significant changes occurred in the Russian, Near East and African markets, whose demands increased 16.3 per cent and 6.9 per cent, respectively. Effect of the war on other European markets is demonstrated by a decrease over the five years of its share of total exports from 22.9 per cent to 0.4 per cent.

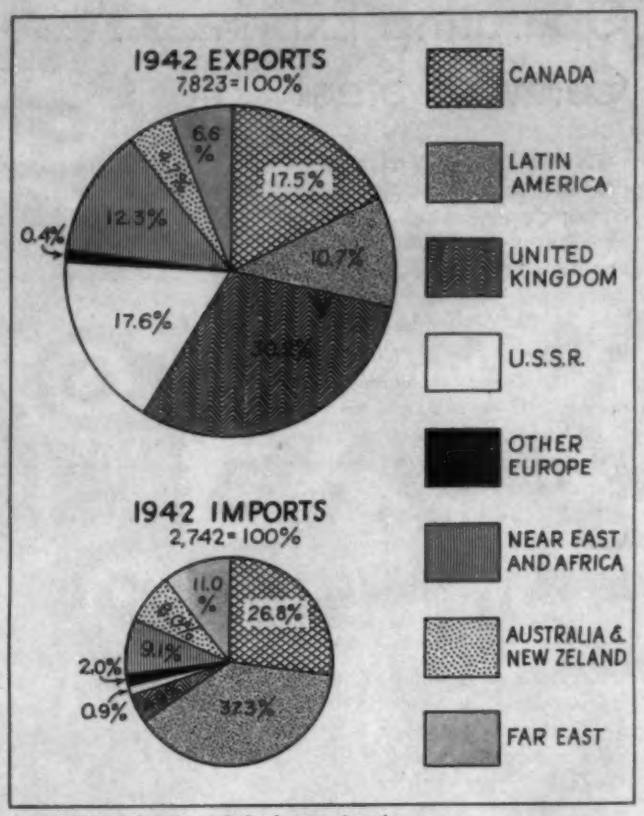


Chart: National Industrial Conference Board

The program of lend-lease aid by the United States is being matched by other United Nations to the extent of their available resources which aid, up to the present, has taken the form principally of assistance to and supply for our forces abroad. Lack of shipping and restrictions to trade imposed by war reduced imports to $2,742,000,000 in 1942. Logically the nearest neighbors, Canada and Latin American countries contributed over 64 per cent of the total. Imports from the Far East, which in 1937 made up a third of the total of $3,084,000,000, fell to 11 per cent last year. Shipments received from the United Kingdom declined 1.7 per cent. However, the Near East and Africa, increased its share of United States business 4.9 per cent in 1942.

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent capacity)	98.5	99.0	98.5	99.0
Freight Car Loadings (unit—1000 cars)	3,926	3,990	3,904	3,372
Bit. Coal Production (daily av.—1000 tons)	1,945	1,928	1,584	2,092
Petroleum Production (daily av.—1000 bbls.)	3,936	4,006	4,076	3,601
Construction Volume (ENR—unit $1,000,000)	106.9	46.5	72.2	275.0
Automobile and Truck Output (Ward's, number)	16,215	16,775	18,405	21,975

*Dates on request.

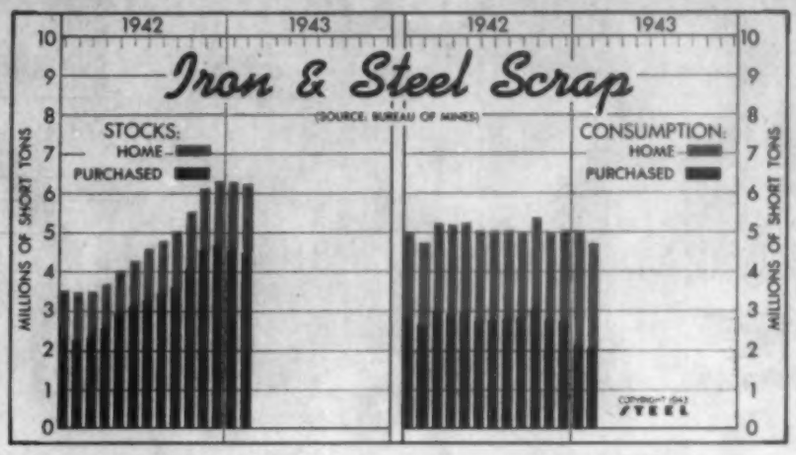
TRADE				
Freight Car Loadings (unit—1000 cars)†	845†	852	816	855
Business Failures (Dun & Bradstreet, number)	56	64	64	191
Money in Circulation (in millions)	$17,196	$16,902	$16,683	$12,141
Retail Sales (change from like week year ago)	+13%	+10%	+ 9%	+ 6%

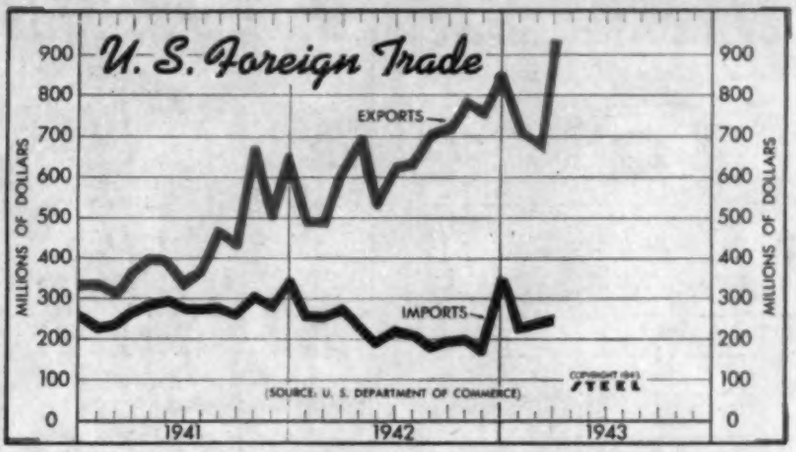
†Preliminary.

Iron and Steel Scrap
Bureau of Mines

(Gross tons—000 omitted)

	Consumers' Stocks		Total Consumption	
	1943	1942	1943	1942
Jan.	6,238	3,503	5,031	4,956
Feb.	6,209	3,455	4,690	4,708
Mar.	.....	3,460	.....	5,221
Apr.	.....	3,582	.....	5,156
May	.....	3,972	.....	5,225
June	.....	4,297	.....	5,000
July	.....	4,579	.....	5,006
Aug.	.....	4,780	.....	5,015
Sept.	.....	4,996	.....	4,955
Oct.	.....	5,530	.....	5,342
Nov.	.....	6,078	.....	4,930
Dec.	.....	6,274	.....	5,037
Total	.....	54,503	.....	60,551





Foreign Trade
Bureau of Foreign and Domestic Commerce

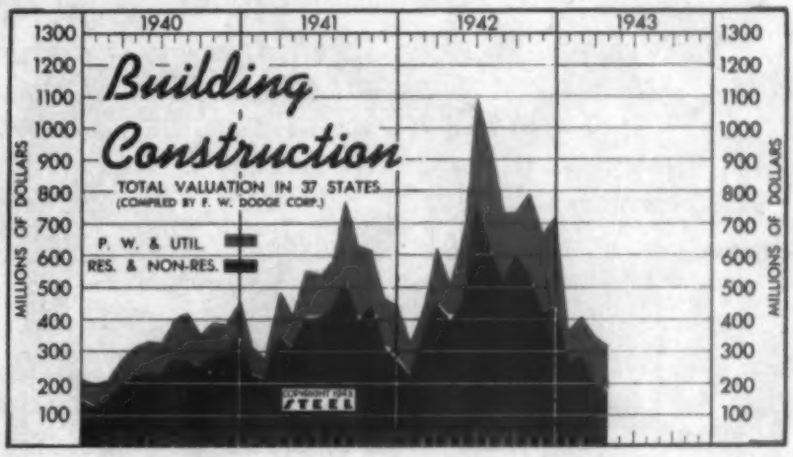
(Unit Value—$1,000,000)

	Exports			Imports		
	1943	1942	1941	1943	1942	1941
Jan.	698	479	325	228	253	229
Feb.	679	478	303	234	253	234
Mar.	931	611	357	248	272	268
Apr.	...	695	385	...	234	287
May	...	525	385	...	191	297
June	...	618	330	...	215	279
July	...	627	359	...	214	278
Aug.	...	694	455	...	184	282
Sept.	...	718	417	...	196	263
Oct.	...	776	606	...	199	304
Nov.	...	750	492	...	174	280
Dec.	...	853	651	...	356	344
Total	....	7826	5126	....	2743	3345

Construction Valuation
In 37 States

(Unit—$1,000,000)

	Public Works-Utilities		Residential-Non-Res.	
	1943	1942	1943	1942
Jan.	85.8	90.8	264.8	226.0
Feb.	112.9	95.9	280.5	337.6
Mar.	123.0	159.7	216.7	451.1
April	127.7	101.7	175.6	397.0
May	.....	227.7	.....	445.8
June	.....	436.4	.....	753.8
July	.....	327.3	.....	616.4
Aug.	.....	213.1	.....	507.9
Sept.	.....	129.6	.....	593.6
Oct.	.....	246.2	.....	534.2
Nov.	.....	241.0	.....	413.2
Dec.	.....	271.0	.....	437.7
Total	.....	.....	.....	.....



FINANCE

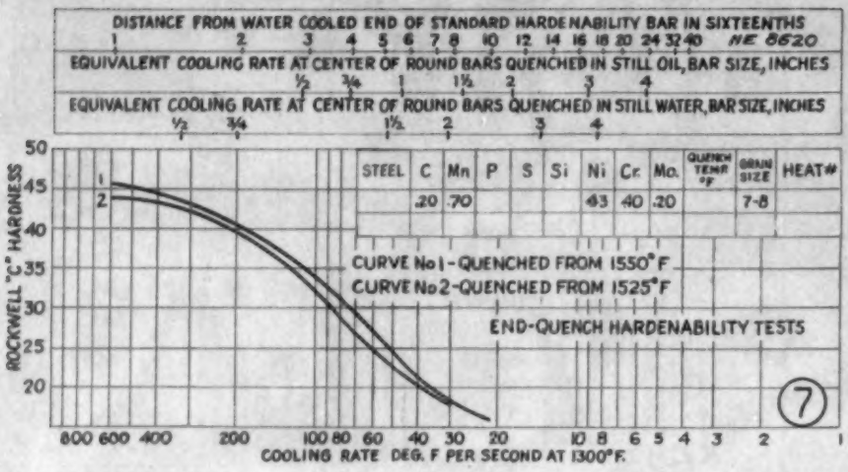
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (D&B—total, in billions)	$7,769	$8,685	$10,098	$6,294
Federal Gross Debt (in billions)	140	139	135	69
Bond Volume, NYSE (in millions)	41.8	68.5	126.1	35.2
Stock Sales, NYSE (thousands of shares)	5,736	6,333	12,915	2,162
Loans and Investments (in millions) †	$47,068	$47,368	$45,772	$9,364
Commercial—Agricultural Loans (in millions) †	5,512	5,545	5,645	6,542
U. S. Govt. Obligations Held (in millions) †	32,275	32,390	29,917	14,539
Bank Debits (member banks, 101 cities) †	11,607	12,304	11,957	9,364

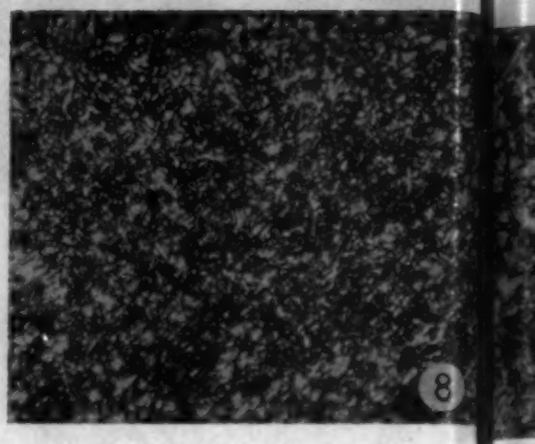
†Member banks, Federal Reserve System. *Dates on request.

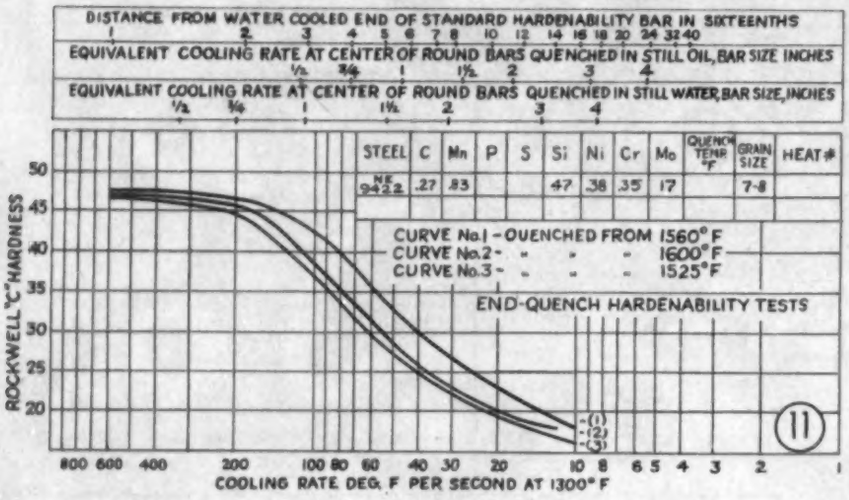
PRICES

STEEL'S composite finished steel price av.	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items) †	246.1	245.7	246.7	229.2
Industrial Raw Materials (Bur. of Labor index) ‡	113.8	113.7	112.5	99.8
Manufactured Products (Bur. of Labor index) ‡	100.9	101.0	100.8	99.2

†1931 = 100. ‡1926 = 100.


DISTANCE FROM WATER COOLED END OF STANDARD HARDENABILITY BAR IN SIXTEENTHS
1 2 3 4 5 6 7 8 10 12 14 16 18 20 24 32 40 NE 8620
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL OIL, BAR SIZE, INCHES
½ ¾ 1 1½ 2 3 4
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL WATER, BAR SIZE, INCHES
½ ¾ 1½ 2 3 4
STEEL C Mn P S Si Ni Cr Mo QUENCH TEMP °F GRAIN SIZE HEAT#
.20 .70 .43 .40 .20 7-8
CURVE No 1 - QUENCHED FROM 1550° F
CURVE No 2 - QUENCHED FROM 1525° F
END-QUENCH HARDENABILITY TESTS
ROCKWELL "C" HARDNESS
50 45 40 35 30 25 20
800 600 400 200 100 80 60 40 30 20 10 8 6 5 4 3 2 1
COOLING RATE DEG. F PER SECOND AT 1300° F.
7

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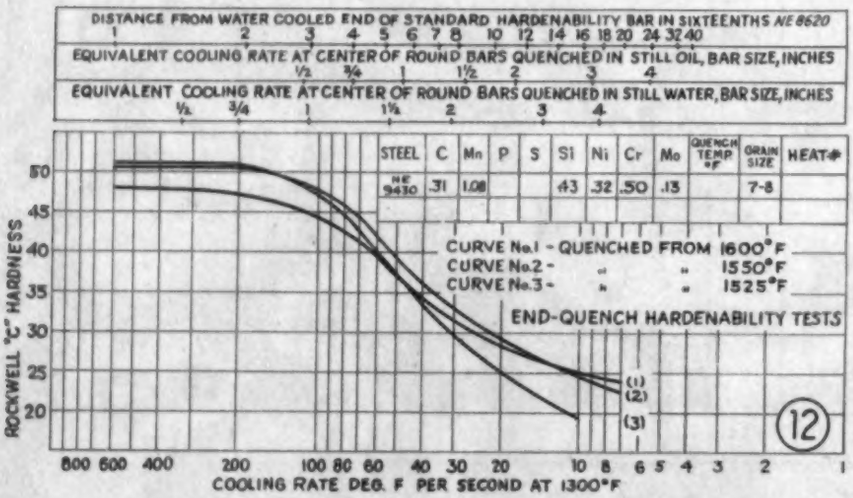
1 2 3 4 5 6 7 8 10 12 14 16 18 20 24 32 40
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL OIL, BAR SIZE INCHES
½ ¾ 1 1½ 2 3 4
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL WATER, BAR SIZE, INCHES
½ ¾ 1 1½ 2 3 4
STEEL C Mn P S Si Ni Cr Mo QUENCH TEMP °F GRAIN SIZE HEAT#
NE 9422 .27 .83 .47 .38 .35 .17 7-8
CURVE No 1 - QUENCHED FROM 1560° F
CURVE No 2 - " " " 1600° F
CURVE No 3 - " " " 1525° F
END-QUENCH HARDENABILITY TESTS
ROCKWELL "C" HARDNESS
50 45 40 35 30 25 20
800 600 400 200 100 80 60 40 30 20 10 8 6 5 4 3 2 1
COOLING RATE DEG. F PER SECOND AT 1300° F
11


DISTANCE FROM WATER COOLED END OF STANDARD HARDENABILITY BAR IN SIXTEENTHS NE 8620
1 2 3 4 5 6 7 8 10 12 14 16 18 20 24 32 40
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL OIL, BAR SIZE, INCHES
½ ¾ 1 1½ 2 3 4
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL WATER, BAR SIZE, INCHES
½ ¾ 1 1½ 2 3 4
STEEL C Mn P S Si Ni Cr Mo QUENCH TEMP °F GRAIN SIZE HEAT#
NE 9430 .31 1.08 .43 .32 .50 .13 7-8
CURVE No 1 - QUENCHED FROM 1600° F
CURVE No 2 - " " 1550° F
CURVE No 3 - " " 1525° F
END-QUENCH HARDENABILITY TESTS
ROCKWELL "C" HARDNESS
50 45 40 35 30 25 20
800 600 400 200 100 80 60 40 30 20 10 8 6 5 4 3 2 1
COOLING RATE DEG. F PER SECOND AT 1300° F
12

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 8, p. 90; March 22, p. 78; March 29, p. 76; April 5, p. 116 and 118.

For reports from users of NE steels, see Nov. 16, 1942, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109, March 15, p. 96; March 29, p. 72; April 26, p. 84.

For latest revised listing of NE ALLOY steels, see March 1, p. 98.

For list of NE CARBON steels, see March 8, p. 90.

For list of AMS (Aircraft Material Specification) steels, see Sept. 7, 1942, p. 78.

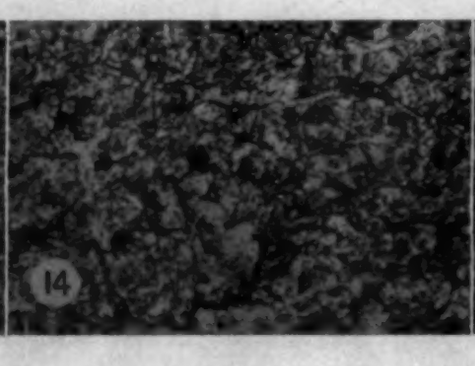
For details of WD (War Department) steels and complete listing, see Feb. 8, p. 80.

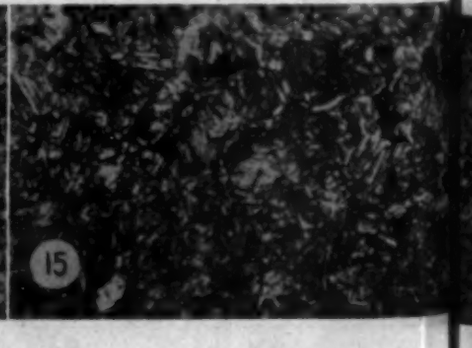
For STEEL's latest *Handbook on NE Steels* and the *NE Steel Selector*, address Readers' Service department, Penton building, Cleveland. Price $1.00 per set.

Fig. 11—Results of end-quench hardenability tests on NE-9422

Fig. 12—Results of end-quench hardenability tests on NE-9430

Fig. 13—Case structure of NE-9422 oil quenched from 1525 degrees Fahr. and drawn for 3 hours at 400 degrees Fahr. Shown at 750 diameters





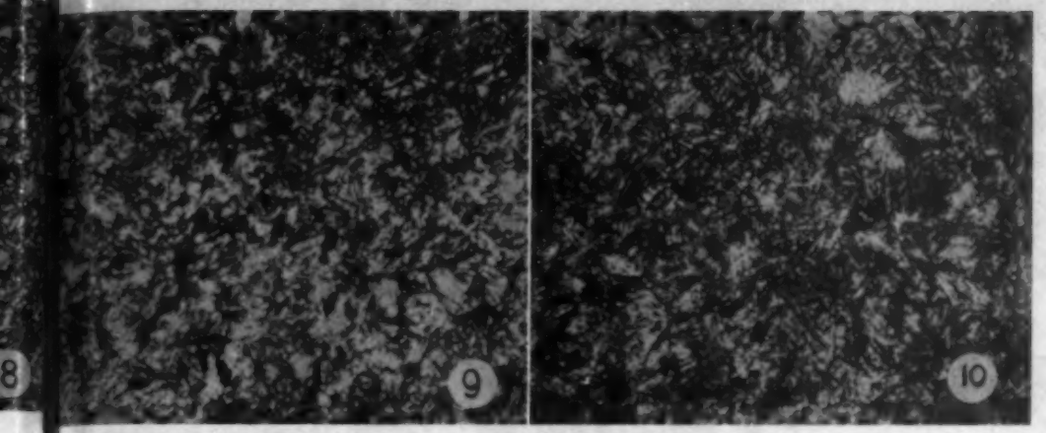


Fig. 7—End-quench hardenability curves from tests on NE-8620

Fig. 8—Case structure of NE-8620 oil quenched from 1500 degrees Fahr. and drawn for 2 hours at 320 degrees Fahr. Shown at 750 diameters

Fig. 9—Same as Fig. 8 but quenched from 1525 degrees Fahr.

Fig. 10—Same as Fig. 8 but quenched from 1550 degrees Fahr.

User Report No. 14 on Experience with . . . .

NE (National Emergency) ALLOY STEELS

In second section of this report, Allis-Chalmers metallurgists give more details of their experience in using some 85 heats of NE steels. Discussion of NE-8620 is concluded here and information presented on NE-9422 and NE-9430

(*Continued from Last Week*)

By FREDERICK HORAK
And
EUGENE CHAMPLIN
Metallurgists
Allis-Chalmers Mfg. Co.
Milwaukee

FURTHER testing of a regular NE-8620 steel was done and the results are shown in Table III. The Jominy hardenability results are shown in Fig. 7. It will be noted that the total difference in hardness readings between the two quenching temperatures at no place is greater than 2 points rockwell C. Traverse hardenability curves on carburized bars also showed this characteristic, corresponding to the Jominy hardenability curves.

Figs. 8, 9 and 10 show at 750 diameters the case structures of carburized NE-8620 reheated to various temperatures and oil quenched. All were drawn at 320 degrees Fahr. for 2 hours. It is shown from the accompanying structures that 1525 degrees Fahr. is the minimum quenching temperature allowable as excess carbide particles are clearly evident at 1500 degrees Fahr.

NE-8620 was tested with the thought of substituting it in place of SAE-4620 for gear transmissions. The properties of the two steels compare very favorably. In general, it has been our experience that NE-8620 can readily be substituted for SAE-4620 for transmission gears.

NE-9422 and 9430: Jominy hardenability curves for NE-9422 and NE-9430 steels are shown in Figs. 11 and 12 respectively. One fact brought out by traverse hardness curves on carburized and hardened 1-inch rounds was that our hardness dropped off considerably at the higher quenching temperatures. This was attributed to a very small amount of decarburization and the fact that the steel was quite abnormal. The slight scale resulting from reheating this steel in the shop gets rid of this soft skin. We have experienced no trouble with soft skins on our experimental NE-9422 gears.

Figs. 13, 14, 15, 16 and 17 show at 750 diameters the case structures of the above steels reheated to different temperatures, oil quenched and drawn at 400 degrees Fahr. for 3 hours. The foregoing photomicrographs together with case and core structures of NE-9422 and NE-9430 shown in Figs. 18 through 27 at 100 diameters clearly indicate maximum solution and refinement of core and case at 1560 degrees Fahr. quenching temperatures.

NE-9422 was tested with the thought of substituting it for NE-8620 for smaller, less stressed transmission gears. See Table IV.

It is evident from Table IV that notch

(*Please turn to Page* 126)

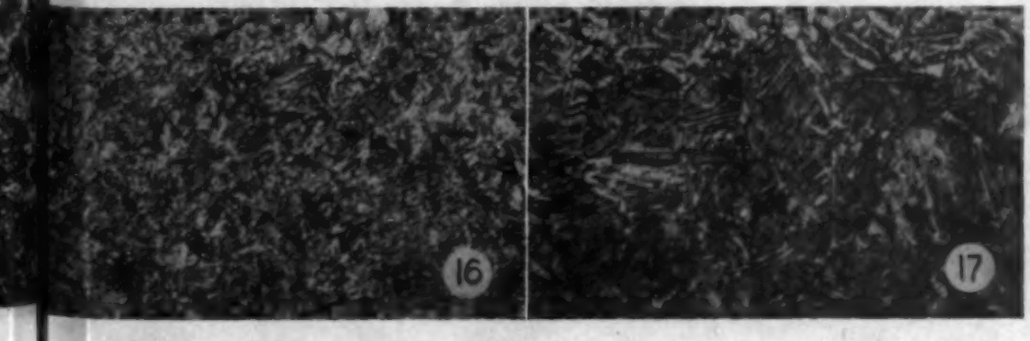
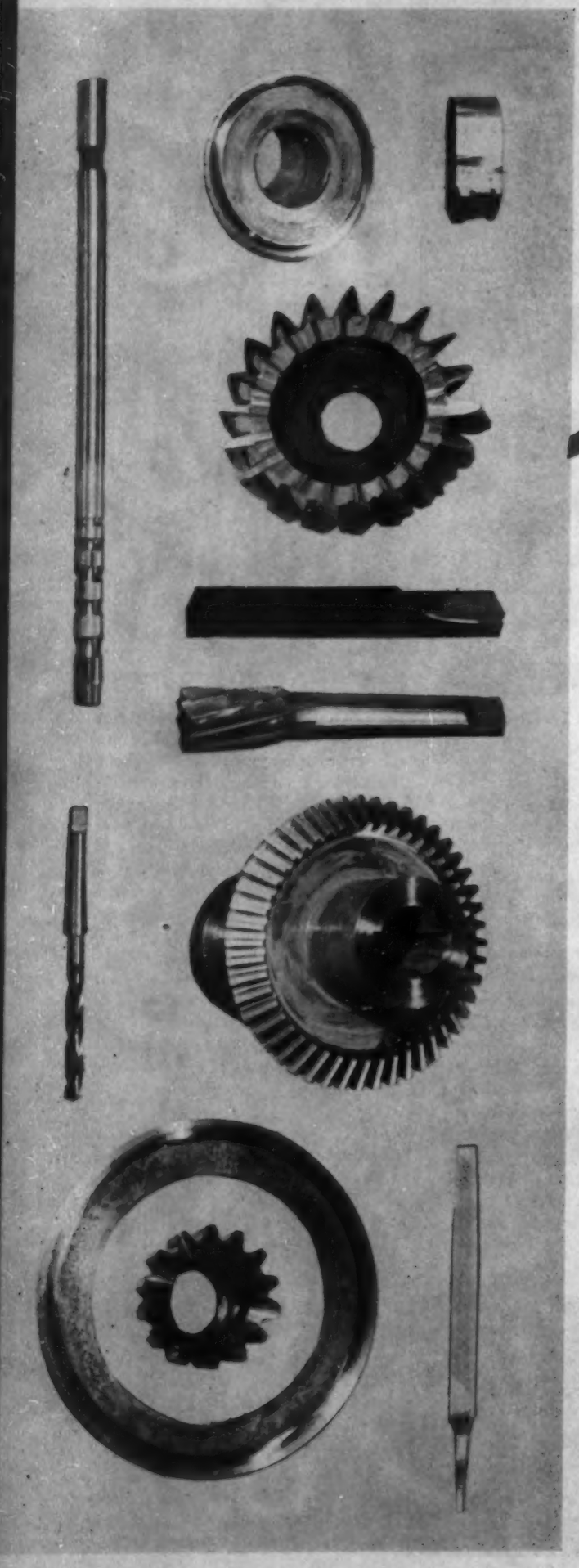


Fig. 14—Same as Fig. 13 only quenched from 1560 degrees Fahr.

Fig. 15—Same as Fig. 13 only quenched from 1600 degrees Fahr.

Fig. 16—Case structure of NE-9430 oil quenched from 1560 degrees Fahr. and drawn for 3 hours at 400 degrees Fahr. Shown at 750 diameters

Fig. 17—Same as Fig. 16 only quenched from 1580 degrees Fahr.



Hundreds of Tests Show Lundbye Process Can Produce . . . .

300% Increase in Tool Life

Any cutting edge appears strongly fortified by this simple non-critical process. Also valuable for increasing resistance to wear and corrosion. First part of this article here examines results obtained and possibilities indicated. Second part next week will analyze characteristics of the finish itself, detail procedure and equipment required

By G. W. Birdsall

Engineering Editor, STEEL

HAVING now been in use for more than a year, it is possible to appraise the value of the Lundbye chromium-plating process with considerable accuracy.

As the result of full page advertisements in July 11, 1942, *Collier's* and September 1942 issue of *The American Magazine* offering the process royalty free for the duration to manufacturers engaged in war work, literally hundreds of companies sent tools in to the Crowell-Collier Springfield, O., plant for sample processing. Upon receipt back in his own plant, each manufacturer made comparative performance tests of treated and untreated tools. Results of some of the most outstanding of these tests are given in Table I. These data were culled from a group of several hundred reports by individual companies on tests made in their own plants, thus are completely unbiased. Names denoted by (*) in the table can be had upon request.

Test Results: Brief reference to Table I will show the amazing results obtainable by the Lundbye process. Remember these tests were made against the best high-speed tool steels. When test after test reveals *increases* of 300, 400, 600—yes, and even several thousand per cent, the only conclusion is that the process must have merit. Of course not every test showed such great increases, *but almost every test did show some increase in tool life*. In fact, where little or no improvement resulted, the user himself was able, for the most part, to put his finger on the cause and subsequently to remedy it.

Significance: From a detailed analysis of the results of these hundreds of tests, it is believed conservative to state that the treatment, if used to best advantage, can be relied upon to show an *increase* in tool life of 300 per cent—that is, tools so processed will last four times as long as duplicate untreated tools working the same material with the same speeds and feeds.

That means our present supply of critical tool steel would go *four times* as far as now if every cutting tool were to be processed by this method in its most effective form.

That means our toolmakers' efforts would go *four times* as far as now. Think what that would mean in relieving critical toolroom bottlenecks.

Besides lengthening tool life, other significant advantages are detailed in a typical user report (19*): "Sample tools for use in manufacture of armor piercing projectiles have recorded a splendid performance in production. It is most apparent that the chromium surface not only supports (fortifies) the cutting edge but *materially reduces chip friction over the tool*. This is confirmed by the nature of the chips and *improved finish of the cut. Spindle torque is definitely reduced, as much as 30 per cent on drilling operations, with consequent saving in machine wear (and power consumption)*".

Cuts Tool Consumption: One test by this user resulted in a rib form tool producing 925 cuts when treated, compared with 230 cuts for an identical untreated tool—a performance ratio better than 4 to 1. With ½-inch twist drills, maximum performance ratio was also well above the 4 to 1 figure, 166 cuts per grind against 37 for an untreated drill. Most significant is his comment:

"The above test data . . . has been fully confirmed by extensive production runs . . . to such a degree that we actually have cancelled outstanding orders for replacement tools."

Reduce Tolerances: Another signififant point is indicated in this same report:

"The plated drills hold size 0.500-inch, plus 0.005-inch tolerance, thereby eliminating a reaming operation."

Rejects Reduced: Another (20*) brings out a further feature in his report. His test was made using No. 40 high-speed high-spiral drills working mineral-filled Bakelite molding using a multi-speed drill press with air vises and pneumatic feed. Treated drills averaged 43 pieces between grinds, against 20 for untreated tools. But only 19 pieces out of 240 had to be scrapped due to drilling when treated tools were used, against 29 with untreated drills.

He comments, "The above shows that treated drills gave 115 per cent longer life between grindings and caused a gratifying decrease in scrap. *This decrease in scrap was due to the treated drills cutting faster and cleaner, thereby creating less heat and preventing heat cracks in the material*".

He continues further, "Tests on which this report is based were made under adverse mechanical conditions and do not show as favorable results for the treated drills as we believe will be ob-

Fig. 1. (Left, oppsite page)—Typical range of parts that provide greatly increased life and better performance when treated by the Lundbye process

Fig. 2. (Right, opposite page)—Close examination of these two printing plates shows upper plate is worn to a considerable extent as is evidenced by the rounded edges of the characters, seen as prominent highlights. Compare with lower plate which shows practically no wear. Amazing thing is that upper plate made by conventional nickel plating processes ran only 300,000 copies and could no longer be used it had worn so badly. On other hand, lower plate, treated by Lundbye process, ran 1,300,000 copies and was estimated as good for at least 5,000,000—a performance ratio of better than 16:1

Immediate left—Axel E. Lundbye, chief engineer, Crowell-Collier Publishing Co., Springfield, O., and originator of the process that bears his name

tained when these mechanical difficulties are overcome".

Increase Machine Speeds: Because of the excellent cutting performance of treated tools, it often is possible to run them at greater feeds and speeds. For example, Cincinnati Planer Co. reports a 41/64-inch high-speed steel drill working at 0.013-inch feed and speed of 250 revolutions per minute drilled 40 holes. With a treated drill, it was possible to go to a feed of 0.019-inch and step up the speed to 400 revolutions per minute. And the treated drill completed 214 holes at this much greater cutting rate. Obviously, this greatly increased production in drilling these holes.

Cuts "Down" Time: Equally important in obtaining increased output is the lengthened work period that ensues from using the treated tools. This makes it possible to eliminate completely many of the machine "stops" formerly required to remove a dull tool, insert and set up a sharp one. This can easily be an important factor in raising production.

For example, another user (*22) reports in connection with regular production work, not on isolated tests: "We increased time between grinds of turret lathe form tools 500 per cent and of milling cutters 1000 per cent. The turret lathe formerly had to be shut down 30 minutes every 3 hours for tool grinding (and setup). *Down time has been reduced from* 15 *per cent to* 3 *per cent and production has increased* 14 *per cent.*"

Range of Application: Table II includes a partial list of cutting tools on which the process has been used. Data on results of comparative performance tests are included. These are not average figures for these types of tools but results of individual performance tests which accounts at least partially for the wide divergence in figures. The process works well on any high-speed steel with carbon content up to 0.60 per cent. It can also be used with steels having higher carbon but then it is necessary to substitute chemical cleaning for the electrolytic cleaning cycle as will be explained in the description of the process itself. Carbon contents up to 0.70 per cent may give no trouble but above 0.70 the carbon is almost sure to cause difficulties by producing a black scum on the work in the electrolytic cleaning cycle, which then prevents proper adherence of the chromium. But this difficulty is easily obviated by going to chemical precleaning.

In addition to high-speed steels, the process can be applied to carbide cutters to improve performance and life. It has already been applied to plain car-

TABLE I—Comparative Tests of Lundbye Processed Tools as Reported by Users on Work Done in Their Own Plants

Company	Test or Tool	Maximum % Increase in Tool Life	Remarks
American Bosch Corp.	Misc. Machining	400	Slip taper type files. Output "at least 2 to 1 over untreated files"
Atchison, Topeka & Santa Fe Railway System	Files for saw sharpening	100	Machined 38 parts against 8 for untreated tool
American Mach. & Metals	Backfacer tool	375	Machined 126 parts against 8
American Mach. & Metals	H.S. thread cutter	1,475	Machined 30 parts against 11
American Mach. & Metals	Finish tool bits on Acme thread	173	
American Mach. & Metals	Spiral mill cutters	100	Machined 16 parts against 8
1*	No. 10-32 taps working copper	684	New taps avg. 200 holes. Worn out tap plated ran 1,568 holes
1*	No. 28 counterbores working stainless	508	Usually get 25 holes per grind. Plated get 152
1*	Small tool bits turning copper	1,200	Plated tool still okay after cutting 13 times usual output
Barium Stainless Steel Corp.	Rough turning SAE-1045 at 177 brinell	900	Gave 50 hours on vertical boring mill compared to usual 5 hours
2*	drilling	409	Drilled 28 pieces with 3 regrinds against usual 5½ pcs., 4 regrinds
3*	Punches	300	Reduced number of punches required
Bigelow-Sanford Carpet Co.	Drilling cast armor steel		Instead of only a few holes, plated drills made 18 to 40; double-plated drill made 125
4*	Tap chasers working shells	771	Worked 1,524 shells against avg. of 175 for nitrided units at 62 R. "C"
5*	Turret lathe form tools	500	Down time for regrinding of cut down from 15% to 3%; production increased 14%
5*	Milling cutters	1,000	Time between grinds increased 1,000%
5*	Small taps	3,000	Better coolant partly responsible
Curtiss-Wright Corp. Airplane Div.	Turret lathe bits	150	Turning ¾-inch hex. 4130 steel bar to 0.406-inch dia.
Cincinnati Planer Co.	1 $\frac{5}{16}$-inch drill	800	High speed drill, 1 grind per hour; plated drill 9 hours, no grind
Cincinnati Planer Co.	Drilling steel tubing, hand feed	887	$\frac{5}{16}$-inch drill, 1800 r.p.m. High speed steel drill, 75 holes; plated drill, 740 holes
Cincinnati Planer Co.	Drilling steel, cast iron	435	41/64-inch drills. High-speed at 0.013-inch feed, 250 r.p.m. 40 holes. Plated at 0.019-inch feed, 400 r.p.m., 214 holes
6*	Build up worn gages		Expect built-up gages to last for the duration
7*	Drills on 1⅝-inch automatic screw machine	1,150	50 hours against the usual 4 hours between regrinds
Foote Bros. Gear & Machine Corp.	Propeller reduction ring gear	350	External Fellows-type shaper cutter; 9 parts against 2 per sharpening. Also increased daily output 33%
Foote Bros. Gear & Machine Corp.	Finish reaming		Production upped 47% by going from 34 to 50 r.p.m. No wear on tool after 60 pieces
Foote Bros. Gear & Machine Corp.	Restored broach 0.0003" undersize		Salvage job gave much finer finish. Output per sharpening increased 600 to 1000 pieces
Goss Printing Press Co.	Machine slides for centerless grinder	333	Output per grind increased from 6 to 26 pieces
Goss Printing Press Co.	Working close grained iron	689	150 pieces against avg. of 19. Cutting speed, 75 f.p.m.
General Electric Co.	Turning tool	500	150 pcs. against avg. of 25; better showing expected, test on bad material
Grapho Products Inc.	Form tool	308	2,617 pcs. against 540 per grind
8*	¼" end mills working Monel	384	116 against 24; feed 0.0039 in sec.; cutter r.p.m. 570
9*	Machining shell	500	Also uses process on gages
23*	Thread chasers	1,233	2,000 against 150 pcs. per set of chasers
23*	Hobs	100	100 pcs. between grinds compared with usual 50
Higgins Industries Inc.	Wear on shaft at packing gland	200	Substituted plated Tobin bronze for a Monel pump shaft; life lengthened several times

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TABLE I—Cont.—Comparative Tests of Lundbye Processed Tools Reported by Users on Work Done in Their Own Plants

Company	Test or Tool	Maximum % Increase in Tool life	Remarks
10*	Thread tapper	400	
11*	Turning 1,030 steel	500	Turning steel burned from plate stock
11*	1⅛" drill	1,100	
12*	Rough boring torch-cut holes	400	20 pcs. against previous max. of 4
12*	Combination reamer	339	In drill press, 15,911 pcs. against usual 4,700
Heckethorn Mfg. & Sup. Co.	Form shaving tool	900	Obtained 30,000 pcs. against 3,000
International Business Machines Corp.	Cutters	300	Aided greatly in maintaining ordnance production schedules in this plant
13*	Reamer	3,000	Produced 28,000 pcs. on test, "*many* thousand per cent increase"
14*	Drills	900	
14*	Spot facing	300	Cast carbon-moly steel, tough job
Molded Insulation Co.	⅛" reamer working aluminum	900	Worked 30,000 pcs. against 3,000 usual and still going strong
Molded Insulation Co.	6-32 taps working Bakelite	900	
National Acme Co.	Cutters	300	
15*	Fellows gear cutters working NE-8447	2,770	5,056 teeth against 1,760 but metal removed per grind was only 0.0095 against 0.095" giving 532.22 teeth per 0.001" grind against 18.53
Pacific Car & Fdry. Co.	Milling cutter	200	
Pacific Car & Fdry. Co.	17/32" drill	708	Drilled 194 holes against 24
RCA Mfg. Co.	Machining molded plastics	150	Report avg. life at least 2½ times that usually obtained
Reynolds Metals Co.	"Doctor" blades on gravure presses	300	
Remington Rand Inc.	Reamer	400	Finished 2,500 pcs. against usual 500
16*	35/64" drill working Anaconda alloy No. 979	450	Obtained 1,100 holes against previous high of 200
17*	41/64" drill working C.I. with hard scale on one side	1,233	Obtained 80 holes against 6 avg. with standard drill
U. S. Pipe & Fdry. Co.	Rough machining cast armor steel	300	Cutting at 28 f.p.m. $\frac{3}{32}$" feed, treated tool worked 40 hours against usual 10
Willys-Overland Motors Inc.	Machining 20 mm. shell	341	Finished 6,633 pcs. against avg. of 1,507 for untreated tool
Willys-Overland Motors Inc.	Machining shell	798	Three plated tools finished 2,617 pcs. against 291 for three untreated tools
18*	Chasers	781	Finishes 2,200 pcs. against 250 avg.

bon steel cutters which then have been substituted satisfactorily for high-speed steel cutters—significant in view of shortages of high-speed steel. It also increases performance and life of "moly" high-speed steel cutters.

When chemical precleaning is used, the finish can be applied on any metal except zinc. This opens up some interesting possibilities, a number of which are examined here:

Corrosion Deterrent—Valves: A processing plant was having considerable trouble with valves on a certain application where the chemicals handled rapidly damaged the valve and seat, causing leakage. Bronze was no good at all, leaking almost at once. However, when chromium plated by the Lundbye process, bronze valves and seats had been performing satisfactorily for 2½ months and were still going strong when last reported. Similar results obtained in other applications where corrosion is a factor indicate the chromium plate produced by this method closely approaches the high inherent corrosion resistance of solid chromium.

Controls Dimensions—Gages: A shell producer after using the process in his own plant for 5 weeks reports: "We have been able to build up worn gages to exact sizes so they are good as new. Since many of our gages are not only very expensive but also difficult to procure due to the great demand, this one use of the plating system has and will continue to effect a tremendous saving in both time and money. In fact, we expect it will make it possible for us to use the same gages for the duration.

"Recently we received two new thread plug gages that were oversize by 0.0003-inch. By first plating them and then stripping, *we were able to reduce them uniformly to the desired dimensions* so they could be used satisfactorily, thus avoiding the delay that would have occurred in obtaining new gages."

Reduces Friction: One of the important characteristics of chromium plated surfaces is their low coefficient of friction. They are characterized as "slippery, greasy and nonwetting". That is probably the reason why dental drills processed by the Lundbye method develop less heat resulting in less pain and discomfort to the patient. Too, cutting tools so treated can make heavier cuts. One example is in making threads on armor steel bolts. Whereas plain Stellite cutters broke, treated cutters were able to make the full depth thread in one turning due to reduced friction.

Reduced friction also is evident in elimination of "blueing" of the steel cuttings when making extremely heavy cuts. Ordinary cutters develop sufficient heat to cause the turnings to become blue or almost black. Treated cutters doing same work produce bright turnings, indicating reduced friction and absence of high heat.

Too, reduced friction enables much higher cutting speeds and feeds to be employed. For example, treated drills are now being used to produce 7/16-inch diameter holes in armor plate 1 inch thick in 32 seconds.

Cuts Wear: Any process that reduces surface friction should be of value in lengthening life of gears and cams, and that has been found true of this process. It is also being used on piston rings of aviation engines to increase their life several times. Likewise it has been found to multiply life of gears several times. Life of cams on automatic screw machines has been lengthened to four times that usually experienced.

One of the unusual applications where advantage is being taken of this characteristic of reduced friction is on the inner surface of gun barrels. Here it reduces wear on the rifled interior by lowering friction, increasing life several times over. Of contributing importance here is the fact that the surface is also completely protected against corrosion, preventing that factor from influencing the life of the gun barrel.

For the same reason, the process is providing about a 300 per cent increase in life of dies for extrusion presses and heavy forging presses.

Electrotypes and Engraving Plates: An outstanding possibility for expanded use of the process lies in its application to the printing industry where it replaces nickel on electrotype engravings with unusually successful results. This use of chromium plating is not new

(*Please turn to Page* 134)

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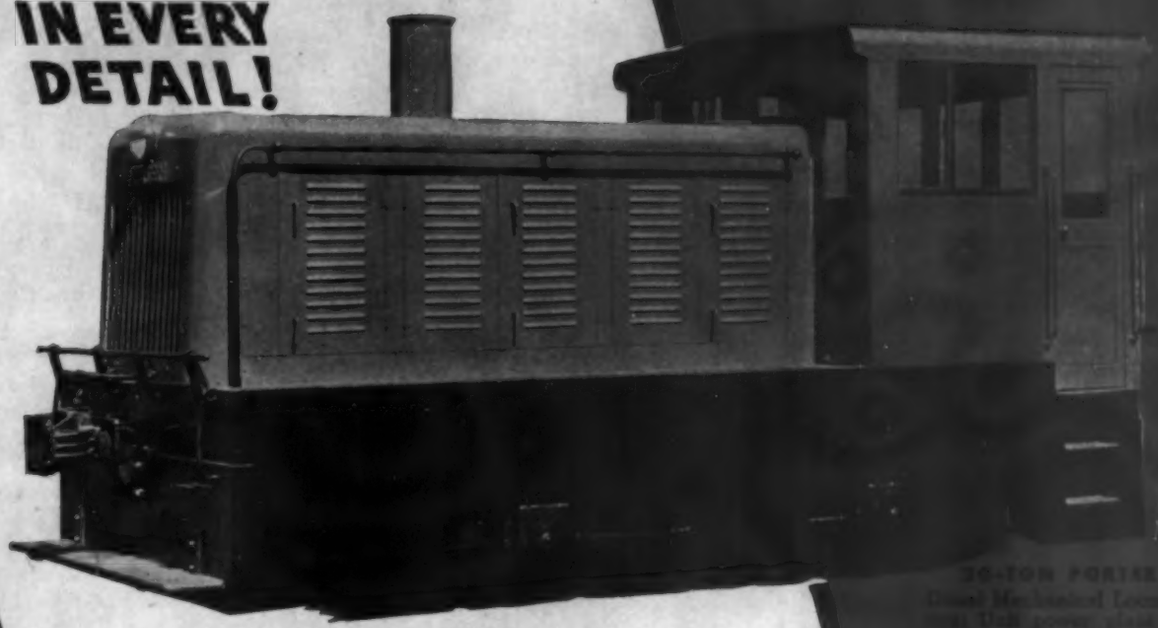

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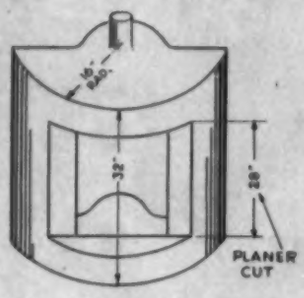
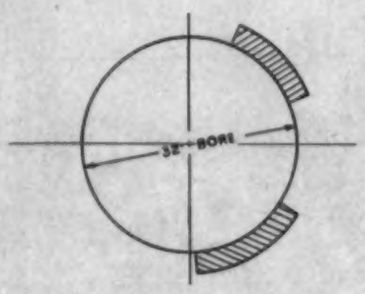
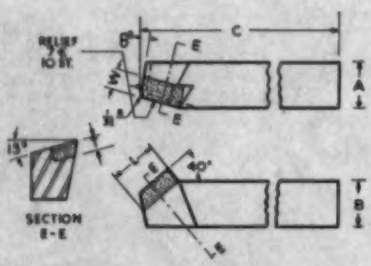
How to Use "SHEAR" TYPE TOOLS

By FRED W. LUCHT
Engineer
Carboloy Co. Inc.
Detroit







From top to bottom: Fig. 1—Machining parts of tough alloy steel such as this one is an easy job for shear type tools

Fig. 2—Good results were obtained in machining this part by using a shear type tool having a somewhat smaller negative back rake than standard

Fig. 3—Interrupted cuts like this are handled effectively on a 35-year old boring machine

Fig. 4—Carboloy cemented-carbide shear type tools are characterized by unusually high negative back rake

INTRODUCTION of some of the extremely tough alloy steel castings for war equipment was followed by extensive application of carbide tools in order to obtain satisfactory production rates. Interrupted cuts caused some difficulty at first in obtaining high cutting speeds.

Some years ago tools with an extreme negative back rate had been applied successfully by Carboloy engineers but little general attention was paid to this development. But when the demand for carbides for machining steel began to rise, it was discovered that "shear" type tools had been developed by Northern Pump Co. and were doing an outstanding job in machining certain ordnance parts at that plant. Since then Carboloy cemented carbide "shear" type tools have been successful in eliminating many a bottleneck on interrupted steel cutting jobs.

When properly applied the shear type tool effectively meets the problem of interrupted steel cutting with carbides. Fundamentally what the tool does is to enable the entire cutting edge of the tool to enter the cut before the nose radius of the tool does so. Since the nose radius is normally the weakest part of any tool, the shock load in interrupted cutting is thus transferred back from the nose to a stronger portion of the tool. As a result the nose radius practically never breaks down first when using a shear type tool, enabling the tool to hold size over longer cuts. It also permits the use of a smaller nose radius than would otherwise be the case which, together with a relatively large side rake, imparts to the tool good free-cutting action.

In general, the major advantage of shear type tools is that they will withstand more shock and impact load than standard tool types. This ability to take abuse enables them to stand up better when taking interrupted cuts and when the material is scaly or impregnated with sand pockets and hard spots.

Ability to withstand shock means that they can be operated at higher cutting speeds and feeds than standard tools. In addition the shape of the tool also reduces the impact on the machine in interrupted cuts. This is particularly pronounced when the tool is mounted in rams with considerable overhang. On quite old machines where considerable backlash exists, shear type tools present a definite advantage from this standpoint. It should be pointed out, however, that shear type tools tend to use more power than conventional tools for the same feed, speed and depth of cut.

On continuous cuts, shear type tools will produce a chip which may be difficult to handle. Ground in chip breakers have not proved generally satisfactory since the tool directs the chip toward the finish cut. For this reason the shear type tool is also not as suitable for the taking of finish cuts as it is for roughing, since the chip may develop a tendency to mar the finished surface.

Cannot be Run Close to Center

While satisfactory on most facing cuts, shear type tools cannot be run in as close to center as standard tool designs because the nose radius lies too far behind center in a tool with considerable negative back rake.

"Standard designs" of shear type tools are now available in shank sizes 1 inch square or larger. Smaller shank sizes are not generally recommended due to the decreased lack of shank support below the carbide tip.

Tool Design: Fig. 4 shows the "standard design" shear type tool adopted as a result of extensive experimental production work in the field employing various shapes and angles. It will be noted that the main characteristic of the tool is a 40-degree negative back rake, together with a 15-degree side rake. The tip is mounted in such a way that it projects somewhat above the top of the shank, this design providing increased support below the nose of the tool with the large negative back rake used.

While the 15-degree side rake angle appears satisfactory for most types of

(*Please turn to Page* 124)

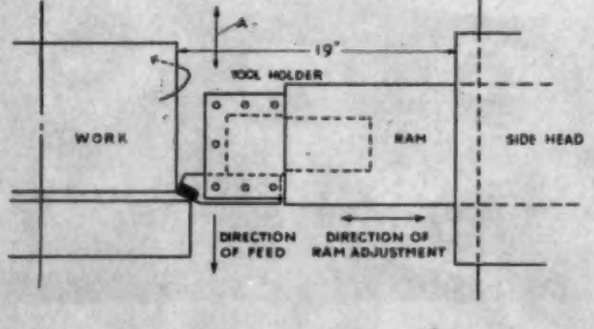
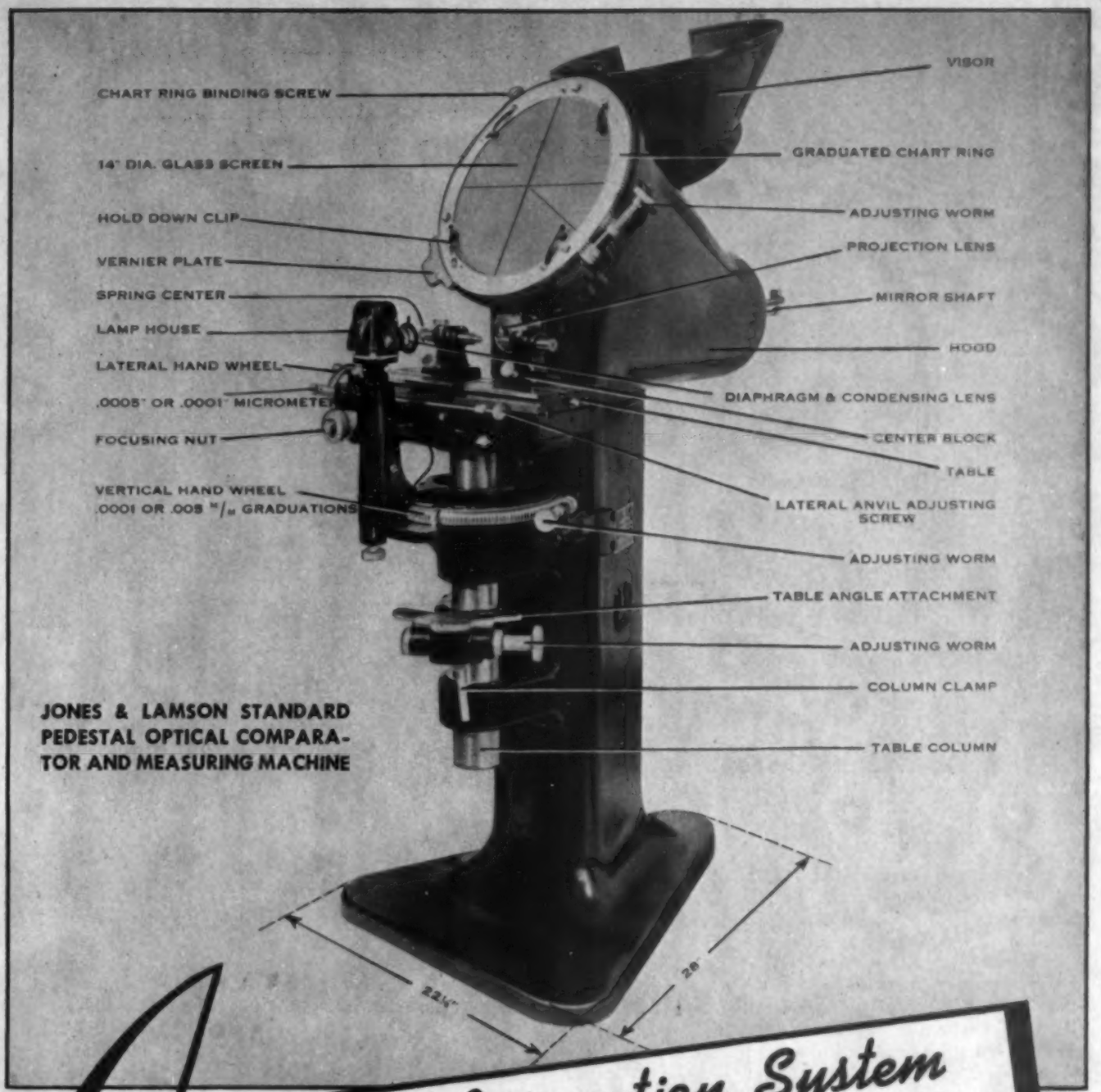


Fig. 5—In a setup of this kind, shear type tools will virtually eliminate vibration in the direction of arrows A, vibration frequently experienced with conventional tools. Thus shear type tools permit higher cutting speeds



JONES & LAMSON STANDARD PEDESTAL OPTICAL COMPARATOR AND MEASURING MACHINE

A Complete Inspection System

FOR TOOLROOM OR SHOP

Thousands of Jones & Lamson Optical Comparators are in use today for the inspection and measurement of a great variety of parts where, often, other methods had failed or had been too costly. Their use has resulted in better tools and gages, greater efficiency in inspection and substantial saving through the elimination of costly mechanical gages.

Our Comparators cover the whole field of Inspection by Optical Projection and our inspection engineers will welcome the opportunity to study your inspection problems and make recommendations based upon more than twenty years experience in this field.

JONES & LAMSON MACHINE COMPANY
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Manufacturers of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies.

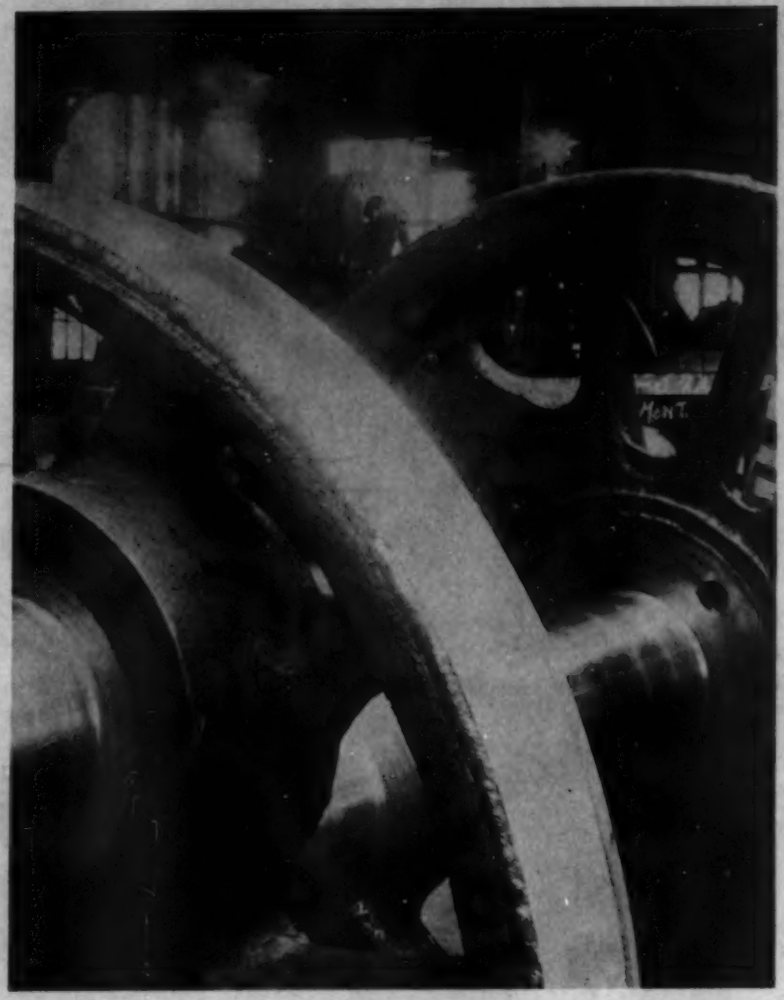
J&L

PROFIT-PRODUCING MACHINE TOOLS

Locomotive Driving Wheel Centers

. . . . restored to original diameter by welding process

By C. H. EASUN
Assistant Mechanical Engineer
Central Region
Canadian National Railways
Toronto, Ont., Canada



Close-up of weld on outside of wheel

FOR SOME time the increasing number of driving tire failures which have occurred on fast passenger and freight locomotives caused concern to the officers of the mechanical department. During the investigation it was discovered that there were no failures with tires on newly built power or on engines which had wheel centers turned before new tires were applied.

This indicated that the cause of the tire breaking had some relation to the wheel center. Although the shop practices were followed in regard to turning the rims when out-of-round, it was found that a number of rims were apparently pitted or distorted, and that the new tires applied did not have a perfect metal-to-metal contact.

Metal to Metal Contact Sought

At this point of the investigation decision was made that all wheel centers, when tires were being applied, would be turned so that at each application of the new tire we would have new metal contact between the two surfaces. It then became necessary to place a limit on the permissible reduction of the diameter of the wheel center. This limit was set at ⅛-inch less than standard diameter. When wheel centers had been reduced to this limit, consideration was given to some method of restoring them to the original diameter.

The method adopted consists of the application of a steel plate liner in three sections, welded to the wheel center. While this method was partially successful, trouble was experienced in applying the sectional liner. It was found almost impossible to obtain a metal-to-metal contact between the surfaces, which is essential before any welding is attempted. Further experimentation developed the idea of applying this liner in one piece, and this method was finally adopted as follows:

A mild steel liner is cut to length, and the edges are beveled on a plate planer. Liner is rolled to the required diameter, after which the joint is welded. This ring is then placed in a large boring mill and bored to an inside diameter which will provide a shrink fit on the wheel center. The wheel center is turned to a diameter of ¾-inch less than the standard diameter, and the edges are beveled. The ring is now heated, using a gas-fired heating ring. Then it is placed on the wheel center and allowed to cool. When cool, the edges of the liner are arc welded to the wheel center as follows:

The ring is tack welded at intervals on both sides of the wheel, using a 5/32-inch diameter shielded arc electrodes. The pair of wheels, mounted on the axle, are placed on end as this position facilitates down-hand welding. Two operators are used, each using a Lincoln 400-ampere dual-control welding machine. One operator works on the lower wheel, and the other on the upper wheel.

The first pass of weld is made with 5/32-inch diameter shielded arc electrodes. For the second pass, ¼-inch diameter shielded arc electrodes are used. These electrodes are of the same type as Lincoln Fleet Weld No. 7. Upon the completion of one side of each wheel, the position of the wheels is reversed and the operation repeated.

The method just described is less costly than the application of the three-piece liner, chiefly because extensive clamping operations are unnecessary and the application is easier. It is believed that longer life is obtained from the wheel centers which are reclaimed in this manner.

The steel liner is found tougher than the original casting and provides a better seat for the tire. Necessary figures to sub-

From a paper in the $200,000 award program sponsored by the James F. Lincoln Arc Welding Foundation.

WAS THE 72nd YOUR BABY?

THE SMALL metal parts many of us are working on today may be in Tunis next month. If they don't do their job, boys like Bill may never cross the ocean again.

Parts like EMPIRE bolts and nuts, for example. Shipped by carloads, each one must fit, tighten easily, stand up under fire. They must move *fast* — or war equipment will move slowly.

Here, at R B & W, machines of our own design are improving the strength of metal, cold-reducing Empire bolts, cold-forging the threads, cold-punching Empire nuts, repunching to insure perfect fit. To this inventiveness, we're adding *personal care* to make quite sure no weapon fails or waits because of us.

★ If you, too, are making vital "bits and parts", we'll send you posters made up from this ad—omitting any reference to us. They're free. Just write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W — *Making strong the things that make America strong*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

TABLE I—Table Showing Cost of Making Up and Applying Two New Wheel Centers and Two New Crankpins to the Old Axle

Material			
Two wheel centers—4,600 lbs. each		$1,080.00	
Two crank pins — 465 lbs. each		120.00	
Stores expense		72.00	
			$1,272.00
Labor (including cost of living bonus)			
Remove axle and crankpins	— 3 hrs. @ 75c	2.25	
Machine two new wheels	—40 hrs. @ 86c	34.40	
Apply wheels to axle	— 3 hrs. @ 75c	2.25	
Machine and apply hub liners and keys	— 7 hrs. @ 86c	6.02	
Turn crankpins and bore crankpin holes	— 7 hrs. @ 86c	6.02	
Apply crankpins	— 2 hrs. @ 86c	1.72	
Turn wheel centers for tire	— 3 hrs. @ 86c	2.58	
Shop expense		27.62	
			82.86
Total			1,354.86
Credit for scrap			75.99
Total			$1,278.87

Table Showing Cost of Machining Old Wheel Center Mounted on Axle for Application of Steel Bands to Restore Original Diameter

Labor (including cost of living bonus)			
Machining wheel centers ready for band	— 5 hrs. @ 75c	3.75	
Turning bands after application	— 5 hrs. @ 86c	4.30	
Shop expense		4.03	
			12.08
Manufacturing bands:			
Material			
Mild steel	—480 lbs. @ 3¾c lb.	18.00	
S.A. Electrodes for welding	— 65 lbs. @ 10c lb.	6.50	
Stores expense		1.47	
			25.97
Labor (including cost of living bonus)			
Machining bands before welding and rolling	—10 hrs. @ 86c	8.60	
Welding joints in bands	— 1 hr. @ 86c	.86	
Bore to fit wheel center	—12 hrs. @ 86c	10.32	
Weld to wheel center	—18 hrs. @ 86c	15.48	
Shop expense		17.63	
			52.89
Total			90.94

Comparative Statement Showing Estimated Savings

Cost of applying two new wheel centers with new crank pins to the old axle	$1,278.87
Cost to restore wheel centers to the original diameter by the application of steel bands, are welded to the whole center	90.94
Saving per pair wheels	1,187.93
Saving per wheel	593.96
Proportionate cost saving	92.2g
Estimated number of wheel centers which will be reclaimed per annum over the entire system, representing a total saving of	$29,695.00

Note:—
The above figures are all based on actual operations as performed in our shops.

stantiate this statement, however, would be difficult to obtain as it would be almost impossible to keep an accurate record of the service of any particular wheel. It is realized that with present day high speeds and maximum loadings the closest attention should be given to the condition of wheels and tires.

Table I gives the cost of the various operations. It will be observed that the method described shows a considerable saving in labor and material.

Salsbury Corp. Reveals Quick Checking Method

A final inspection gage which requires about one-sixth the time formerly needed to check draw punches can be made very economically by any company interested, according to Salsbury Corp., 1161 Florence avenue, Los Angeles, responsible for the development of the unit.

Costing less than $70 to make, the gage consists of a machined base approximately 14 inches long on which is mounted the necessary tool supports and three Koch test indicators.

The tool the gage was designed to test is a precision-ground draw punch having three tapers. Formerly, checking diameters of these tapers required separate micrometer readings by a trained inspector. Now, three operations are combined into one by simply laying the tool on the gage and checking all three diameters at once.

The gage, the company reports, is not necessarily limited to checking draw punches. By adding additional indicators, it can be made to check other tools or make as many simultaneous inspections as needed.

The development is not for sale, but by revealing how to make the gage the company feels that other manufacturers with similar production problems might be able to use the idea in helping push war production.

Joins Theory, Practice Of Metal Heat Treating

Heat Treatment of Metals, by J. Winning; cloth, 99 pages, 5½ x 8½ inches; published by Chemical Publishing Co. Inc., Brooklyn, N. Y., for $1.50.

Tremendous increases in metal production, with resultant increase of new blood, new methods and demands for increased efficiency and production, showed a need for closer union between theory and practice. This volume has been written to give a condensed but fairly complete logical account of modern heat treating methods, with the underlined principles on which they are founded.

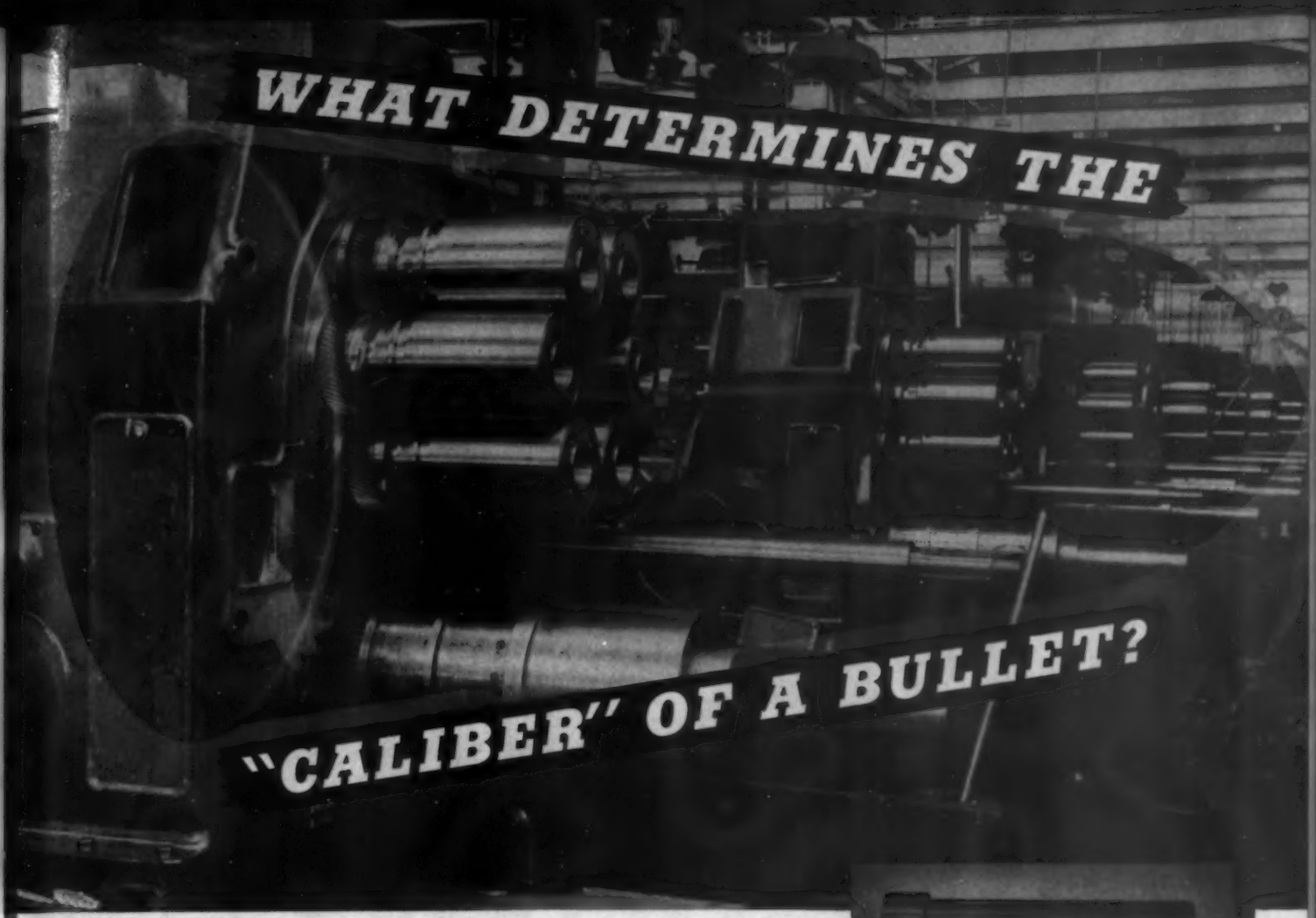
It is designed for engineers and others who, while not being specialists in metallurgy, make contact with heat treatment and its problems in their work. The author believes a thorough grasp of essential theoretical points is imperative to a practical application and for that reason has given that side of the subject as much prominence as the practical.

Realizing the impossibility of including all commercial alloys in use today a selection was made of the materials dealt with. The alloys presented are thoroughly representative of their classes and all are widely-used materials.

New Coating for Corrosive Conditions Offered

A new protective coating for extremely corrosive conditions is announced by United Chromium Inc., 51 East Forty-second street, New York. Called Ucilon, it is formulated with improved synthetic resins, producing a tough, flexible coating that is resistant to organic and inorganic acids, alkalies, salts, alcohol, gasoline, oils, greases and moisture.

The coating also is reported to have excellent dielectric strength, and can be readily applied to wood, metal, concrete and other surfaces by brushing, spraying or dipping. Also being offered by the company is Ucilon F, a special formulation for use on objects coming in contact with food products.



OSTUCO "semi-tailors" seamless tubing parts for precision tools . . . .

VITAL COGS in the arsenal of democracy are the precision machine tools which insure the high caliber of workmanship that goes into every round of ammunition.

Long before Pearl Harbor, OSTUCO supplied machine tool manufacturers with seamless steel tubing, drawn, finished and formed to individual specifications for such parts as spindles, collet and pusher tubes. The ability to meet these rigid specifications substantially reduces machining operations, an advantage that counts even more today when the demand for greater production must be met without any let-up in quality. And while Victory gets first consideration now, OSTUCO is looking ahead to applying newly-acquired skills, techniques and experience to the post-war developments your new experience is certain to produce.

(A) Samples of OSTUCO tubing supplied to the National Acme Company; (B) Finished spindles, and pusher tubes used in the Acme-Gridley machines illustrated above. Upsetting for spindles done by OSTUCO. Unusually thin-walled tubing furnished with high tensile strength. Inside of tubes is commercially smooth finish supplied by mill. Forming, and finishing operations at mill cut number of operations this manufacturer must make. (Photos courtesy of National Acme Company.)

This is for Victory:

- • • — BUY MORE WAR BONDS
- • • — KEEP UP THE SCRAP
- • • — BE ON THE JOB EVERY DAY

THE OHIO SEAMLESS TUBE COMPANY

SHELBY OSTUCO OHIO

Bin hoppers and feeders showing material to be sintered being distributed in proper proportions on belt conveyor. Material is conveyed to hopper serving pug mill. Photo, Youngstown Sheet & Tube Co.

SINTERING—
Plant Design-I

(Continued from Last Week)

By CHARLES E. AGNEW
Consultant
Blast Furnace & Sintering Plant Operation
Cleveland

Certain fundamental factors in the design of a sintering plant govern the economy of the operation regardless of the type of sintering machine used. With these fundamentals recognized the construction of the plant resolves itself into an engineering problem of arranging the material handling equipment to the best advantage of that particular plant.

From the foregoing premise the physical characteristics of the materials to be sintered will govern the mechanical equipment necessary *before* the sintering machine and the chemical composition of the materials will govern the mechanical equipment necessary *after* the sintering machine. Particle size is the most important physical characteristic of a material to be sintered because it not only affects the regularity of feeding the material to the sintering machine but the sintering operation itself. The silica content is the most important item of chemical composition of a material to be sintered because the percentage of iron and the chemical composition of the iron silicate compounds formed during the sintering operation determine the natural friability of the sinter.

I—Preparation of Materials and Regularity of Feed

The plant built to sinter flue dust only has a simple problem of material preparation. Screening coke or other debris from the dust is the only preparation necessary to assure uniform feed conditions. Plants sintering concentrated ores likewise have a simple problem of material preparation because the preparation has been done at the ore concentration plant. For the plant which must sinter an earthy ore with a wide range in particle size there are more complicated preparation problems and the sintering plant of the future probably will require a material preparation house equipped with screens, crushers, and mixers, ahead of the feed storage bins. In present operations where earthy ores are screened it is usual practice to transfer the oversize particles to the furnace trestle and charge them into the furnace direct. The opinion is offered that with this practice an opportunity to increase sinter production is being overlooked by failing to take advantage of the benefits to be had from crushing the oversize particles and re-introducing them into the mix to aid in opening up the bed of material to a better passage of waste gas. Such gritty material would have the same beneficial affect upon the permeability of the bed of material to the passage of gas as that obtained from the use of return material. Likewise

MOORE RAPID

Lectromelt

FURNACES

SIZES UP TO 100 TONS

THE ruggedness of Lectromelt top charge furnaces assures larger tonnages of high alloy steels. Their simplicity affords longer, more efficient service with minimum maintenance. Their quick charging features enable them to produce steel faster.

PITTSBURGH LECTROMELT FURNACE CORPORATION

PITTSBURGH, PENNSYLVANIA

such gritty material could be used in a batch mixer with a plastic ore to destroy the plastic characteristic which is most objectionable to the uniform feeding of such ore. The practicality of such use for oversize particles will vary with materials.

Maintaining the regularity in percentages of the different materials in the mix is of the utmost importance in producing a uniform product. In the continuous process, which is the more generally used, the percentages of the different components are set by area of feed gate opening which area gives the volume flow in the desired percentages. To maintain the desired chemical specification of sinter the materials must be mixed in the proper percentages by weight but actually the weight is controlled by the volume flow which serves all purposes so long as the materials are fed uniformly.

Importance of Particle Sizes

Physical characteristics of the materials to be fed determine the feed problems. If there is a wide range in the particle sizes there will be irregularity in the weight of the material when fed by volume because such a material must obey the natural law governing the flow of loose solids. There is certain to be more or less segregation of particle sizes as the flow line of the stock in the feed bin changes and such segregation is certain to affect the weight of the materials when fed by volume. The ideal maximum in particle size for uniform feeding might be said to be ⅛-inch but the practical size will vary with materials. There will be less segregation of particles in a soft earthy ore than in a granular material of the same screen test because of the tendency of the earthy particles to adhere. In actual practice soft ores screened to minus ¾-inch have given good results.

Since all sintering machine grate bars are on a horizontal plane the materials to be sintered must be delivered to the bars in a vertical stream and again there is segregation of particle sizes, most of the coarse particles rolling to the bottom of the heap and most of the fines remaining at the top with the intermediate sizes being progressively deposited. The affect of this segregation is to partially nullify the benefits from the pugging operation; the bed of material will be too tight on top and too loose on the bottom. The smaller the range of particle sizes of materials the less segregation there will be and permeability to air and gas through a vertical section of the bed will be more uniform.

Feeding equipment for all raw materials should operate at a uniform speed. This can be accomplished by applying power to all feeders from a single line shaft. With this arrangement the volume of feed can be controlled by the speed of the line shaft and since the percentages of materials are set by the area of the feed gate openings a change in line shaft speed does not affect the percentages but only the volume of feed. Each feeder should be equipped with a separate clutch so that it can be made idle when not needed. The fuel feeder should have a separate control because the fuel percentage needs adjustment occasionally as the efficiency of it varies.

II—Use of Return Material

Return material is collected through grid bars located in the chute at the discharge end of the sintering machine. The grid chute primarily was intended to recover unsintered fines but a large percentage of the material recovered is sintered. Return material plays two vital parts in the sintering operation, as collected it is hot and dry and these two properties are the only means of counteracting excess moisture in raw materials. When sintering a material of high moisture content, or any natural ore in periods of wet weather, the heat and dryness of the return material are absolutely necessary to the success of the operation and the conservation of the two properties for the purpose described is of vital importance.

Serves Dual Purpose

That part of the return material which is sintered particles serves a dual purpose: it supplies heat when needed and when pugged with the raw materials it serves to make the bed of material on the hearth more permeable to air and waste gas. The need for this second service is of the greatest importance particularly when the raw materials are of small particle size.

The amount and character of return material produced is affected by the quality of the sinter, length of grid chute, and the width of opening between grid bars. Assuming a normal operation of good sinter the percentage of unsintered fines in the return material will be small and the larger percentage will be sintered particles graduated down from the top size, which is governed by the width of the grid bar openings, to the approximate size of the unsintered material. For the purpose of opening up the bed of material to the passage of air it is practice to mix return material and raw material in the proportions necessary to give a bed sufficiently permeable.

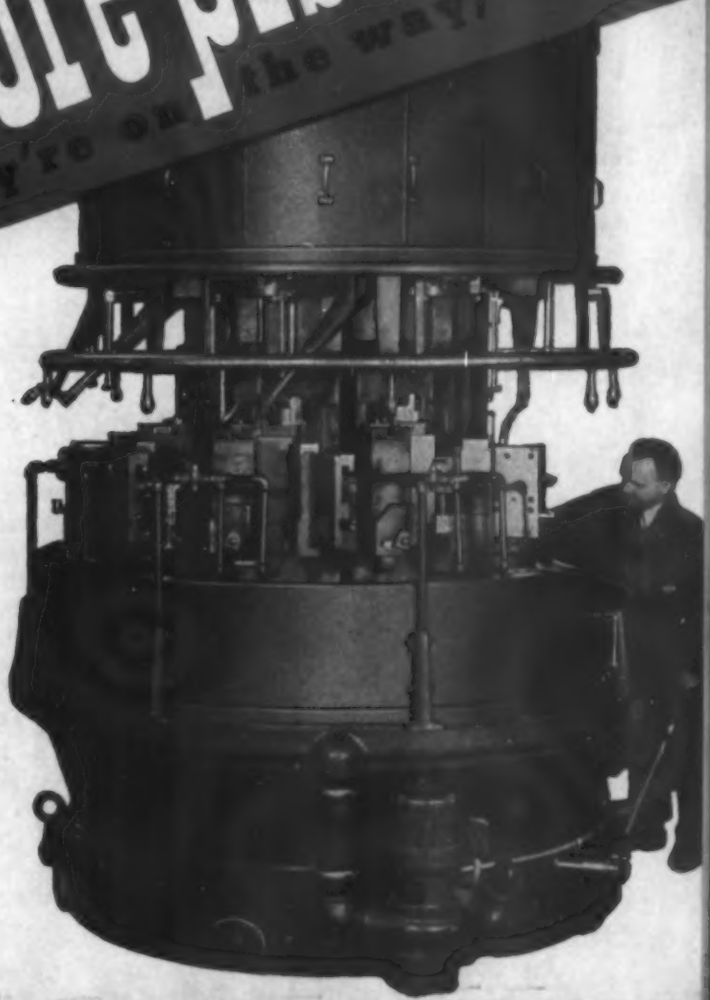
An increase in the percentage of return material in the mix does not decrease tonnage. For any given sintering machine the cubical dimensions over the hearth are fixed and the productive capacity of that machine depends upon the number of times per hour the materials over the hearth are replaced with fresh material. An increased percentage of return material in the mix will decrease the percentage of fresh material in a like amount but production will not be decreased so long as there is an increase in the sintering rate to compensate for the decreased percentage of fresh material. Frequently production

(*Please turn to Page* 139)

CLASSROOM MIKE: One way to teach the use of the micrometer is shown above—method used by Lodge & Shipley Machine Co., Cincinnati, for training new employes for its production line. The giant instrument is reported to facilitate training considerably for reasons obvious in the view

more pistons?

"They're on the way, Sir!"



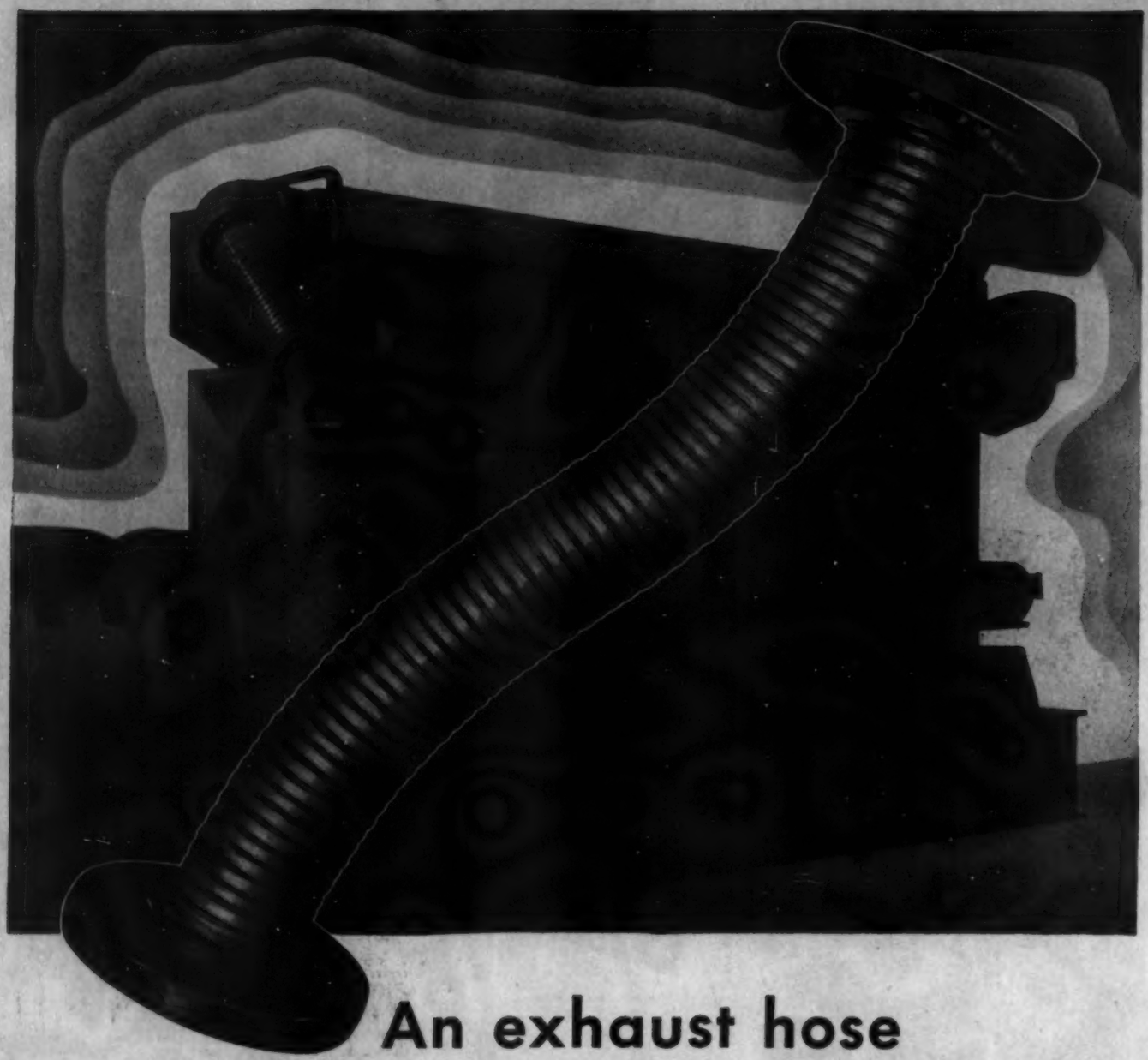
Yes, they're on the way—the thousands of pistons needed by the engines of the planes, the jeeps, the tanks manned by America's fighting forces.

Many of those thousands are machined on Bullard Mult-Au-Matics. With the Mult-Au-Matic, you need less time, fewer men, and far less floor space to get those pistons.

To smash the Axis now . . . to smash the competition after the war . . . you need the Mult-Au-Matic. Ask the Bullard engineers for an estimate on your work.

THE BULLARD COMPANY

Bridgeport, Conn.



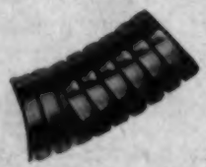
An exhaust hose that isn't easily "exhausted"

Once installed, American Diesel Engine Exhaust Hose stays on the job for years . . . absorbing vibration, providing permanent tightness against seepage, deadening noise, compensating for expansion and contraction caused by the terrific temperature changes encountered in exhaust lines.

Here's why American stands up so well in this unusually severe service: essentially this hose is a flexible pipe. Made of heavy galvanized steel, it is spirally wound so that each convolution becomes fully interlocked with the next. A continuous packing, fed into a prepared groove, insures permanent tightness. And because it's flexible, it's easy to install. American also furnishes flexible metal tubing for fuel, air and starting lines on Diesels.

In addition to Diesel duty, many other types of American Flexible Metal Hose and Tubing serve war industries with distinction, some by conveying oil, steam, gas and water; others as a vacuum service for removing filings and dust, as protective armor and to shield electric wires, and in a thousand and one other important applications.

Whatever your needs in metal hose or tubing, you'll likely find one in the American line that will help you do the job just a little bit better. Your inquiries are invited. 42201



American Interlocked — wound of strip metal, joints packed; the toughest type of extremely flexible metal hose

AMERICAN METAL HOSE BRANCH OF THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada:
Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA *American Metal Hose*

WHAT IS THE FUTURE OF . . . .

Induction Heating

in heat treating, joining, forging, melting

By FRANK W. CURTIS
Chief Engineer
Van Norman Machine Tool Co.
Springfield, Mass.

(*Concluded from May 31 Issue*)

OTHER hardening operations revealing the scope of high-frequency induction hardening are shown in Fig. 4. The cluster gear at *A* has both gear sections hardened, each being handled separately as is usual practice with parts of this kind. The gear at *B* is provided with a bronze bushing, which can be pressed into place before cutting the gear teeth since the heat generated during induction hardening will not reach the center portion of the blank.

With induction heating, it is also possible to harden carburized parts such as the spiral bevel gear shown at *C*. This procedure is sometimes necessary on spiral gears because the eddy currents of the high-frequency current cause heating more on one side of the teeth than on the other.

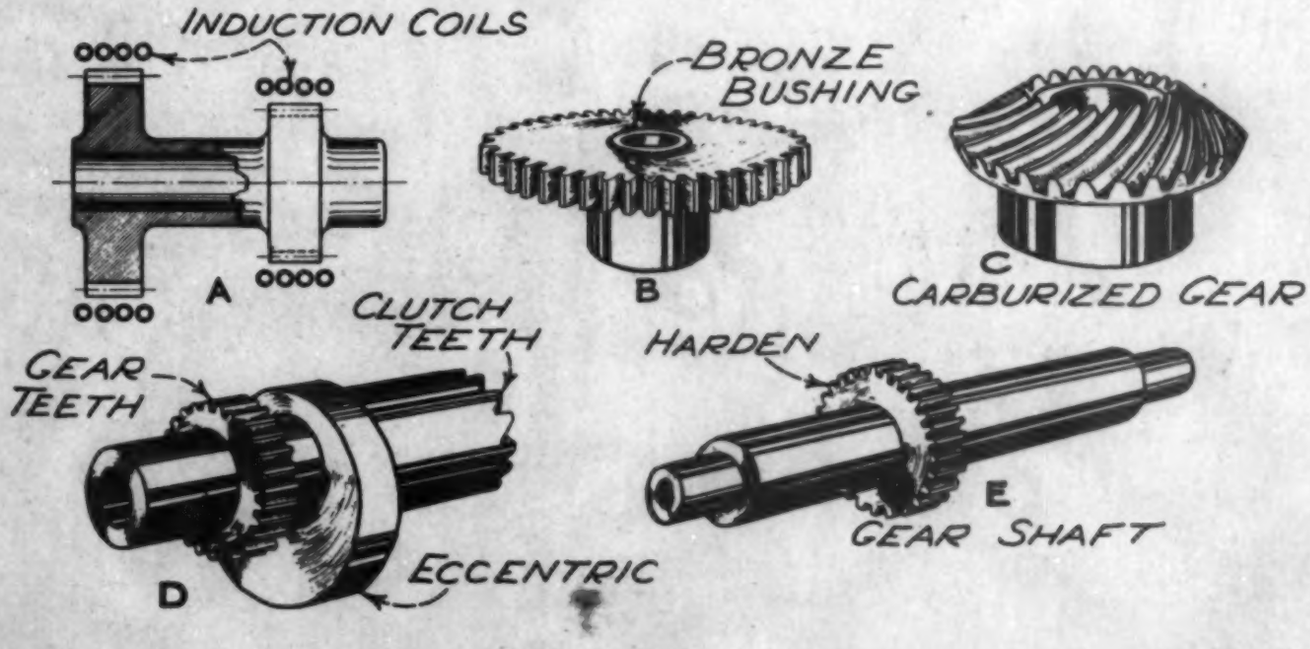
Differential hardening, producing different degrees of hardness on the same piece, is also possible with high-frequency induction heating. On the part shown at *D*, the gear teeth are hardened to 54 rockwell C, the eccentric to 62, and the clutch teeth to 57.

With parts like that at *E*, localized hardening by induction has many advantages, the outstanding being the absence of warpage which eliminates a costly straightening operation. Parts can also be heat treated to between, say, 32 and 34 rockwell C, then localized hardened. Such a case is the shaft shown at *F* which has two surfaces hardened to 62 rockwell C without affecting the other heat-treated portions.

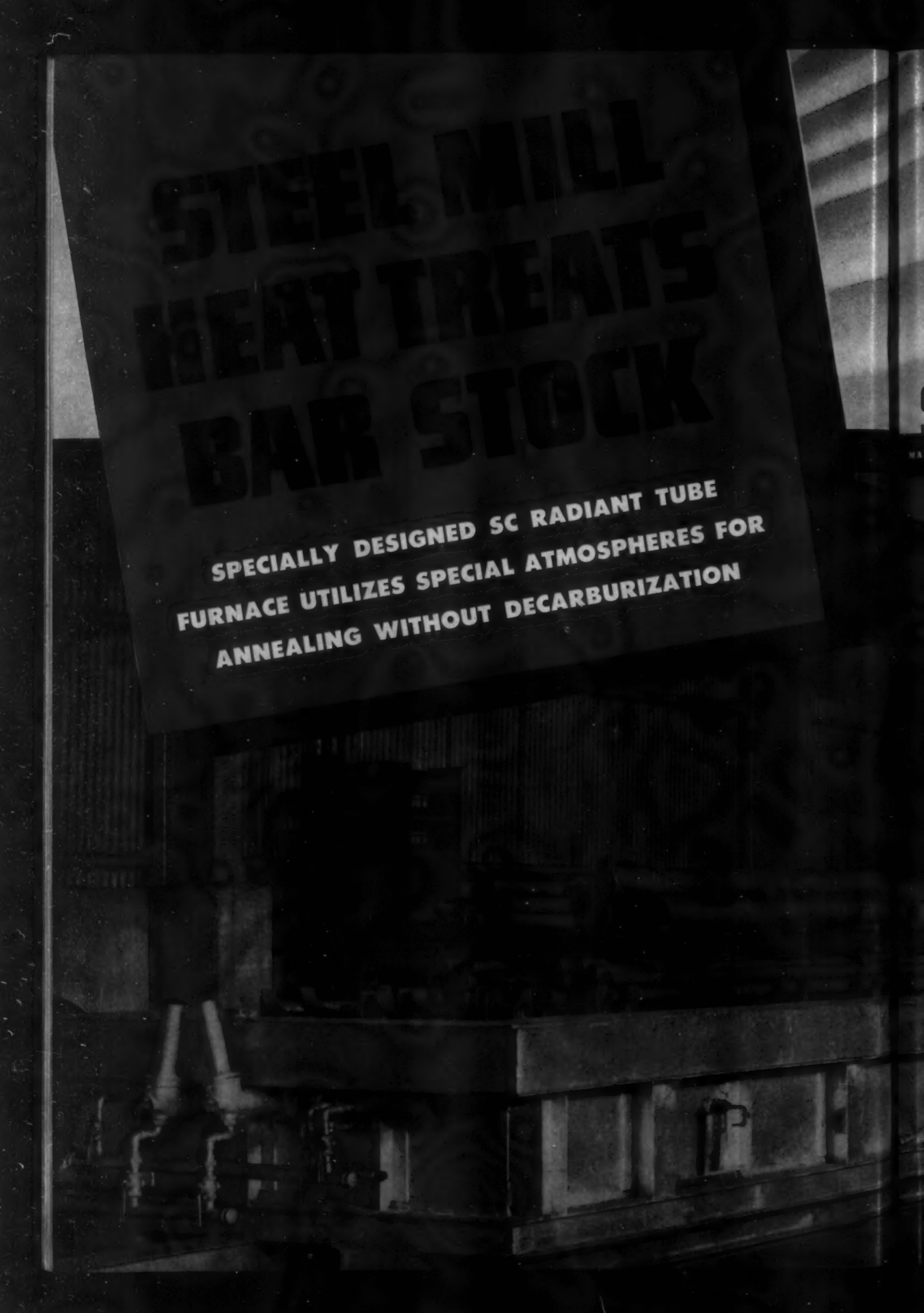
While a steel having 0.40 per cent carbon is satisfactory for high-frequency hardening, it must be remembered that carbon is a more powerful hardening element than alloys. Even though a steel with a carbon content of 0.35 per cent can be successfully induction hardened, a steel with higher carbon is preferable, especially since the hardness can be controlled by means of timing as has already been explained. A practical water-quenching steel for induction hardening is X-1340, now SAE C-1141, also C-1144. Because of the presence of manganese and sulphur in these grades of steel, they have excellent machining qualities, far better than either SAE-1040 or 1045. As far as can be determined, the manganese and sulphur do not have any affect on hardenability with induction heating.

An ideal steel for high-frequency induction hardening applications that has not been made so far, but which can well be visioned as a general all-purpose steel would be an X-1350, or perhaps X-1360 (C-1150 or C-1160). With good machinability and with suitable response to induction hardening, as it no doubt would possess, this steel could well fill the requirements for an extremely broad range of machine parts in many indus-

Fig. 4. (Above and below)—This illustrates the variety of parts that can be hardened by induction heating



From a paper presented at the annual meeting of the American Society of Tool Engineers, Milwaukee, March 27, 1943.


STEEL MILL HEAT TREATS BAR STOCK
SPECIALLY DESIGNED SC RADIANT TUBE FURNACE UTILIZES SPECIAL ATMOSPHERES FOR ANNEALING WITHOUT DECARBURIZATION

AGAIN, Surface Combustion leads with this outstanding heat treating unit for finishing operations in the steel mill. This unit is characteristic of SC organization ability to build equipment to meet specific needs of industry.

Rods and bar stock of high and low carbon steels are being heat treated in this SC Radiant Tube Car Bottom Furnace which utilizes a Char-Mo atmosphere to prevent decarburization. Combined are the car bottom and individual lift-cover features that eliminate furnace doors and increase efficiency. The method of control that is employed makes certain that the gaseous atmosphere will be in equilibrium with the steel at all heating and cooling temperatures. All size stocks can be annealed without scale or decarburization.

The flexibility and efficiency of use for annealing both plain and alloy steels makes this SC Steel Mill unit both practical and desirable. Whenever equipment is needed for roughing and finishing operations you can depend upon SC experience and facilities to build practical equipment to meet your need.

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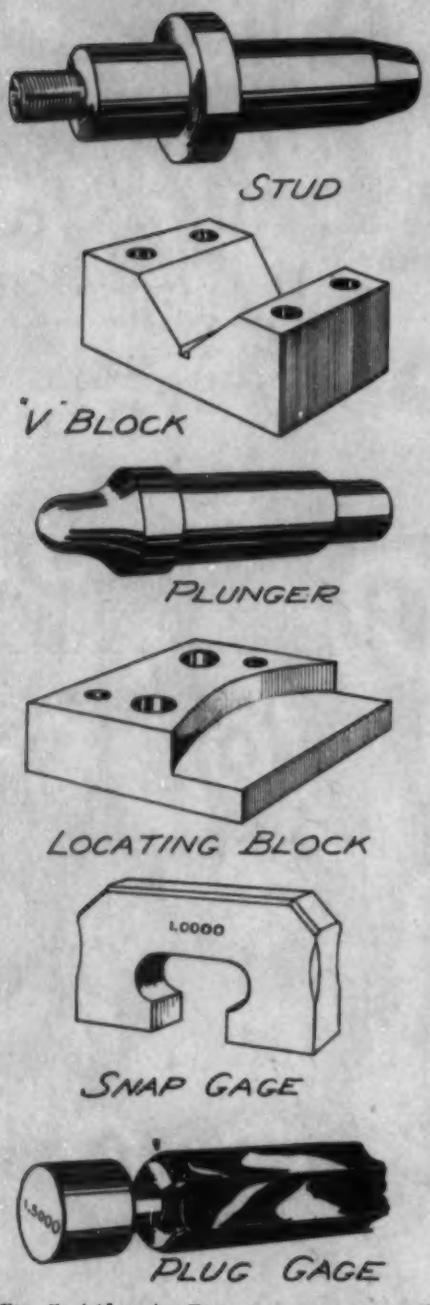
MANUFACTURERS OF INDUSTRIAL FURNACES · JANITROL GAS-FIRED SPACE HEATING EQUIPMENT · AND KATHABAR AIR CONDITIONING SYSTEMS



tries. In the meantime, C-1144 is the nearest approach to the solution, having about 0.45 per cent carbon, 1.50 manganese and 0.28 sulphur. This steel will suit the requirements of many parts where a hardness of 55 to 57 rockwell C will suffice. In cases where a higher hardness is needed, a carbon content of at least 0.50 per cent would be the answer.

Toolroom Uses: Before long, induction heating will find many uses in modern toolrooms and to some extent may change our principles of tool design. Fixture components, such as clamps, locating blocks, studs, bushings, V-blocks, plungers, etc., can all be hardened by the induction process. Where haste is a factor, no other method would prove faster or better. A variety of tool and fixture parts suited to induction heating are illustrated in Fig. 5. Another possibility in this connection is the hardening of fixture parts after they have been assembled to the base or body unit.

Brazing: The wide scope of brazing made possible by induction heating will have an affect on engineering design. Parts now machined or forged in one piece may well be made of two or more pieces and joined together by induction brazing with, of course, a direct saving in material cost.

Such an example is shown in Fig. 6, representing a flanged shaft which could easily be made in two pieces, joined by induction brazing. The induction coil is made to surround the assembled pieces, which are centralized in and supported on a fixture. A formed ring of a small diameter brazing rod is placed on the flange. When heated, it flows into the joint faces of both members and forms a solid bond.

Melting: Another practical use for induction heating is that of melting metals in relatively small charges. For this, a small crucible is used, preferably of graphite. Around it is wound a coil of copper tubing with an insulating layer of powered alundum and asbestos as is illustrated in Fig. 7. The charge in the form of iron or steel chips is placed in the crucible.

Heating such a charge, weighing from 10 to 30 pounds, requires only 50 to 60 minutes. The action of the high-frequency induction current causes agitation similar to a volcanic eruption, resulting in the thorough mixing of the charge so especially desirable when alloys are used.

A possibility for this use of high-frequency heating is the making of small castings in plants where foundry facilities are lacking. Another use in this direction is the salvage of precious metals from floor sweepings, an idea already in practice at several plants. For the manufacture of small centrifugal castings, where small heats are required, induction heating has also proved of value.

New Manufacturing Procedures: Induction heating is sure to result in new engineering principles and basic changes in materials for certain types of products. Less expensive designs will be made more practical. Critical or hard-to-get materials will give way to the simpler steels, which are easier to obtain and process. When the full possibilities of induction heating and hardening are exploited, fewer steels will be required for the usual variety of parts made in manufacturing plants so that small inventories will result.

Both high and low-production methods will find induction heating practicable. With standard forms of fixtures, change-overs from one job to another can be made in 2 or 3 minutes, making the handling of lots as low as six or twelve units entirely practicable.

In high-production plants, induction heating units can be installed right in the continuous production line so parts can be hardened after the rough-machining and then passed on to grinders—all in the same department, eliminating transportation and trucking expense to a central heat-treating department.

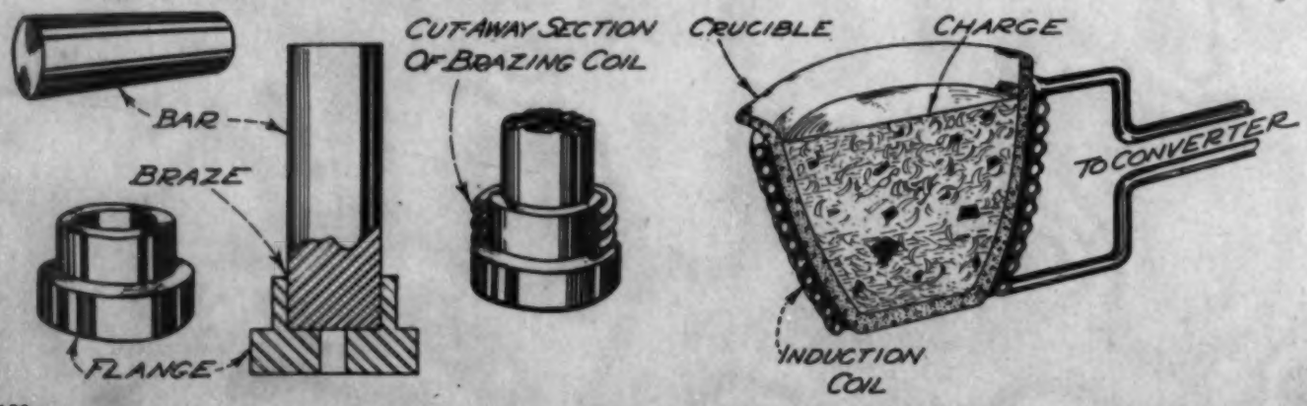
There is no doubt but what the use

(*Please turn to Page* 143)

Fig. 5. (Above)—Fixture components such as these can all be hardened by the induction process

Fig. 6. (Left, below)—This part was formerly made by machining from a solid piece of bar stock. Now much material is saved and machining capacity released by making it from two pieces—joined together by induction brazing as shown

Fig. 7. (Right, below)—Melting small quantities of metal can be done practically by induction heating



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SMALL GRINDING WHEELS

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With W P B approval and endorsement, we stopped making all wheels larger than 3" in diameter. By specializing* on Mounted Points and Grinding Wheels 3" and under in diameter, 24 hours a day, we have stepped up production and are keeping up with demand. Our central location is another big advantage—no time is lost between our production line and yours.

NEW CATALOG—Shows Chicago Mounted Wheels in actual colors, also portable electric tools and time-saving accessories.

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Mounted firmly on its own steel shank, each wheel is a whirling point of easily controlled power that cuts valuable man hours.

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Available in 300 shapes and sizes — every grade and grain — a best wheel for every job.

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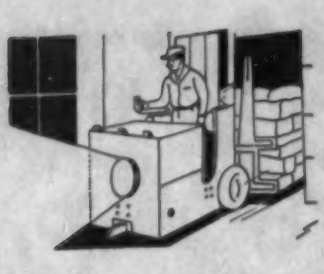
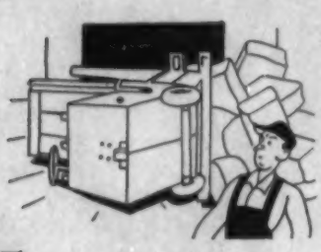


Emergency Lights. A Midwestern manufacturer has a bright idea for emergency lighting. He equipped a number of his battery industrial trucks with headlights and conventional electric outlets. Then he installed 32-volt lighting circuits at various key points in the plant. During power failures each truck proceeds to a designated point, the line is plugged in and the emergency lights go on.

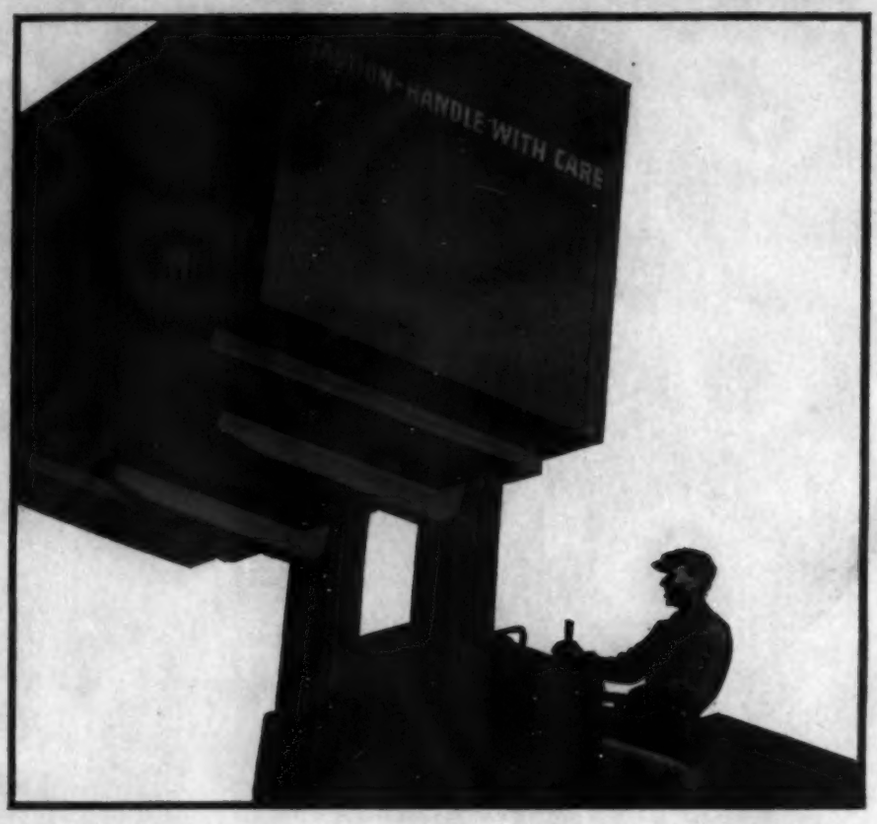


Turnover. One of the reasons experienced industrial truck operators prefer alkaline batteries is that they know the steel construction of these batteries withstands rough usage. They have had their share of accidents in which the trucks overturned without damage to the batteries. And they know by experience that the common electrical accidents don't damage them either.

Quick Battery Exchange. An important reason for the ability of battery industrial trucks to provide dependable 168-hour duty lies in the fact that the batteries work in relays, as railroad locomotives do. Like the train, the truck maintains a schedule. Like the locomotives, one battery furnishes motive power while another is charged and serviced. And with modern power hoists, exchange of batteries is a matter of only a minute or two.

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

POWER for Production

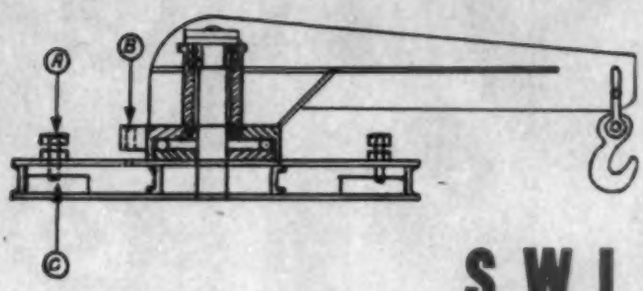


In production, it's what gets done that matters! And for *maximum* production there is nothing more important than *uninterrupted* handling of materials. Of course, man power is essential; so are plant and equipment. But none of these can work at full capacity unless there is a smooth, bottleneck-free flow of materials all the way through receiving, stores, process, assembly and shipment.

It's self-evident, therefore, that the battery industrial trucks in our war industries need the most dependable, trouble-free storage batteries that American inventive genius has produced. It's reassuring that so many of them—a majority in fact—are powered by the *alkaline* type of battery, an invention of Thomas A. Edison. No more durable, reliable portable power source is known.

INDUSTRY NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES



SWING ARM

. . . . improves effectiveness of fork truck in crowded areas and narrow aisles

By GEORGE H. SCHWAB
General Electric Co.
Schenectady, N. Y.

A FORK TRUCK becomes a helpless device for handling material in an aisle or storage space too narrow to permit maneuvering into position for a lift.

As an alternative to the usual solution of increasing the width of the aisles, an arm attachment that can easily be secured to the fork and will swing 90 degrees to each side of it has proved effective.

An additional advantage of the arrangement is that it allows the truck to handle items too small for its fork, and yet too heavy to be piled on a pallet by hand.

Pivots on Turntable

The platform for the arm consists of two pieces of 1-inch steel plate separated by four welded spacers cut from I-beam or U-channel sections. The welded arm pivots on a simple turntable arrangement. Ball bearings make it easy to turn to any position. It may be held at any point of its 180-degree arc by a locking pin. The platform is secured to the fork of the truck by means of four locking screws. It can be attached or removed easily.

The capacity of the device is 1000 pounds as described. There is no reason why this figure could not be increased by proper design.

Fig. 1 shows a cross section of the attachment which can be fitted to any type of fork truck. To attach it to a truck for use, the forks are run into two of the hollow sections between the upper and lower plates and between adjacent separators. Since spacing of forks is adjustable on most trucks, this can be set to fit the attachment. With forks in place, it is impossible for the attachment to skew sideways. It is prevented from slipping off the forks by means of two capscrews or locking bolts bearing against the forks as shown in Fig. 1.

Advantageous in Narrow Aisles

Consider what an advantage this type of lift can be in a narrow aisle such as that in Fig. 4. Here the attachment is being utilized to handle steel tote boxes in and out of storage bank. An aisle merely wide enough to allow the truck to pass is all that is required for the operator can run the truck up to any point, swing the lift hook sideways to pick up a box or unload one. Since the hook arm is pivoted by a ball bearing arrangement as shown in Fig. 1, the arm can be swung easily by hand although it may be carrying its full rated load.

In calculating the maximum load that can be lifted, it is necessary to take into account the fact that the center of the load is no longer between the forks but is in front or to one side of them. The tipping movement from this overhanging load must be considered in making heavy lifts, for it would not be difficult to over-

Fig. 1. (Above)—Diagram of cross section through revolving lift arm attachment for fork trucks. A shows attaching lock bolts for securing unit to truck forks; B is indexing lock pin to hold arm when it is to retain a fixed position; C indicates openings for insertion of truck forks

Fig. 2. (Left, below)—Scrap barrel being loaded on pallet by swing arm attachment working from a truck

Fig. 3. (Right)—Fabricated steel generator frames being stacked in outside storage areas by use of the swing arm attachment. Note aisle is barely wide enough for truck to enter

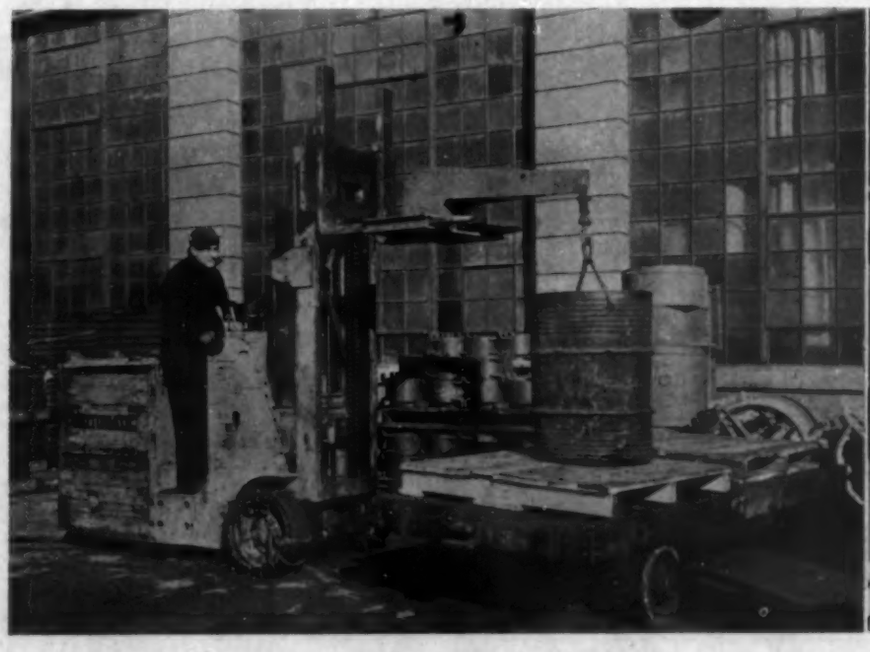


Fig. 4—Parts box being removed from bank by swing arm on fork truck in a narrow aisle

balance the truck.

In Fig. 2, for example, the truck is using the arm extended in front of the forks. This about doubles the distance from the front axle to the center of gravity of the load compared to lifting the same load on the forks.

Fig. 3 shows another valuable application of the attachment. Here it is being used to handle welded fabrications. These motor and generator frames are far too heavy to attempt to handle by hand, yet storing them compactly as shown here would be difficult for a truck without the attachment. In fact, an overhead crane might easily be tied up with this job if the truck and its attachment were not available.

There are many similar places where this type of unit could be employed to advantage. Its flexibility should make it extremely useful in increasing the capacity of storage areas by allowing width of aisles to be decreased, thus utilizing more fully the available floor space.

Shear Type Tools

(*Continued from Page* 106)

cuts in which shear type tools have been used, an increase in side rake beyond this amount has a tendency to reduce power consumption, as might be expected from the freer cutting action. The comparison in Table I is based on the use of a Carboloy standard tool from which the chip breaker has been removed, duplicating all operating conditions in the machining of a steel billet.

It has been found that the best results have been obtained with shear type tools when using Carboloy grade 78B cemented carbide, with the cutting edge along the lead angle stoned to remove the feather edge. When stoning, incidentally, it is advisable to remove the wheel feed marks along the face and relief angles.

The stoned edge should be in the shape of a land approximately 0.002 to 0.005-inch and at an angle of 45 degrees to the direction of feed.

Where a tendency develops for the cutting edge to chip, this chipping action can be decreased by reducing the free-cutting action of the tool. Indications are that this can be accomplished by decreasing the side rake slightly.

In contrast, if the cutting edge tends to run too hot and even begins to glow, a free cutting action can again be obtained by increasing the side rake a slight amount.

Applications: When standard type tools are used to take intermittent cuts on a vertical boring mill with a large ram overhang, see Fig. 5, there is a tendency for the tool and ram to develop vibration in the direction of the feed, as indicated by arrow *A*. In contrast, when a

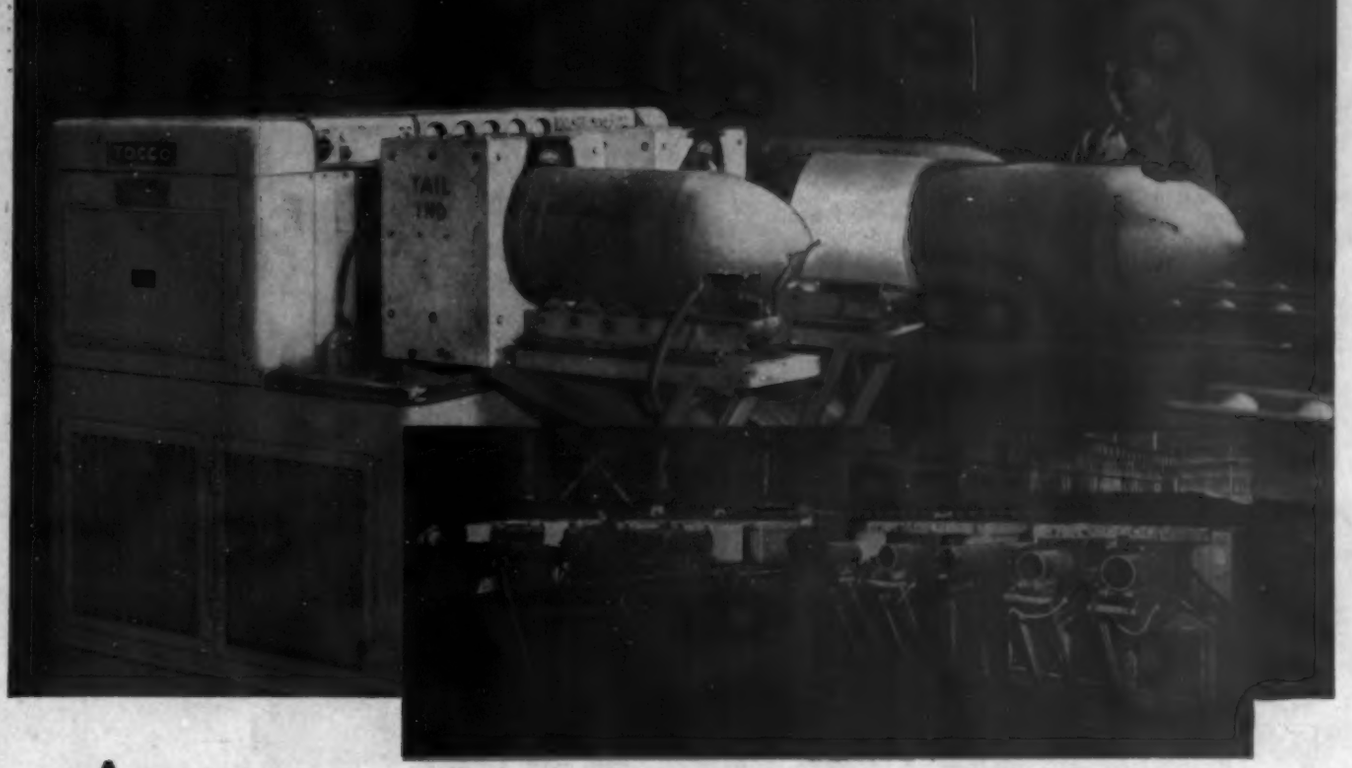
(*Please turn to Page* 144)

TABLE I—Comparison of Performance—Shear Type Tool Versus Standard Turning Tool

Type Tool	Shank	Tool Design BR	SR	ECA	Nose Rad.	Cut Speed Dia.	Depth	RPM	FPM	Feed	Horsepower Motor Input	Increase	Per Cent Increase
		Degrees			Inch								
T-1310	1¼ Sq.	0	8	15	3/32	11	1/8	98	280	.015"	6	...	.....
Shear	1⅛ Sq.	40 Neg.	15	8	3/32	11	1/8	98	280	.015"	8	2	30
T-1310	1¼ Sq.	0	8	15	3/32	11	1/4	98	280	.030"	18	...	.....
Shear	1⅛ Sq.	40 Neg.	15	8	3/32	11	1/4	98	280	.030"	22.5	4.5	25
T-1310	1¼ Sq.	0	8	15	3/32	6⅝	7/16	162	269	.030"	30	...	.....
Shear	1⅛ Sq.	40 Neg.	15	8	3/32	6⅝	7/16	162	269	.030"	34	4	13
Shear	1⅛ Sq.	..	18	8	3/32	6⅝	7/16	162	269	.030"	34	4	13 Cuts freer than 15°
Shear	1⅛ Sq.	..	25	8	3/32	6⅝	7/16	162	269	.030"	32	2	6.7 Cuts freer than both 15° & 18°

Both the shear tool and T-1310 had: La = 15°; Relief = 7°; Grade = 78-B.

THIS "BOMBARDIER" HITS THE TARGET *EVERY* 49 SECONDS



At Wheeling Steel Corp., batteries of TOCCO machines are really putting the heat on the Axis —heating the ends of pipe to 2100° F. for the spinning of bombs.

One operator, manning two TOCCO machines, each with two inductors, heats tail ends of these "500-pounders" and feeds one to the spinner every 49 seconds.

The heated area of every bomb is uniform. TOCCO's automatic timing assures accurate temperature for uniform forming results.

Yes, it's a fast pace, but the "bombardier" maintains it easily. The push of a button starts each TOCCO station. His "bomb bay" between the four stations of the 7' wide TOCCO machines is compact. His working conditions are safe and free of fire, heat and fumes.

Just as TOCCO is blasting the Axis in this and hundreds of other war factories, so will it crack wide open many of your tough problems in post-war planning. Find out how these dependable, rugged induction heat-treating machines will cut your costs and improve your products.

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

TOCCO

World's Fastest, Most Accurate Heat-Treating Process

HARDENING
ANNEALING
BRAZING
HEATING for
forming and forging

NE Alloy Steels

(*Concluded from Page 99*)

toughness and ductility of the higher carbon NE-9400 steels are lower than for similar properties of NE-8620.

(*Concluded Next Week*)

TABLE III—Chemical Analyses and Properties

	C	Mn	Cr	Ni	Mo	Grain Size
NE-8620	.20	.70	.40	.43	.20	7-8
SAE-4620	.25	.57	..	1.84	.25	7-8

Physical Properties

Treatment: Pseudo-carburized at 1700°F.—8 hrs.
Reheated to 1525°F.—Oil quench—Drawn 320°F.—2 hrs.

Grade	Size Treated	Tensile Strength PSI	Yield Point PSI	% Elong. in 2"	% Red. Area	Keyhole Charpy Impact ft. lbs.	Breaking Temperature
NE-8620	½" Rd.	153,000	118,000	14	50		
	1" Rd.	120,000	90,000	22	57	32	75°F.
SAE-4620	½"Rd.	133,000	100,000	15	57	27	75°F.
	1" Rd.	127,000	95,000	22	54	33	75°F.

TABLE IV—Chemical Analyses and Properties

	C	Mn	Si	Cr	Ni	Mo	Grain Size
NE-9422	.27	.83	.47	.35	.38	.17	7
NE-9430	.31	1.08	.43	.50	.32	.13	7-8

Physical Properties

Treatment: Pseudo-carburized at 1700°F.—8 hours.
Reheated to 1560°F., oil quenched—Drawn at 400°F.—3 hours.

Steel	Size Treated	Tensile Strength PSI	Yield Point PSI	% Elong. in 2"	% Red. Area	Keyhole Charpy Impact ft. lbs.	Breaking Temperature
NE-9422	½" Rd.	169,500	98,500	12	25		
	1" Rd.	149,100	95,500	17	41	25	75°F.
						18	—20°F.
NE-9430	½" Rd.	240,000	130,000	10	42		
	1" Rd.	.....	.....	..	..	17½	75°F.
	.....	.....	.....	..	..	14	—20°F.

Fig. 18—Case structure of NE-9422 oil quenched from 1525 degrees Fahr. and drawn for 3 hours at 400 degrees Fahr. Same material and treatments as Fig. 13 except shown here at 100 diameters

Fig. 19—Core structure of same material as Fig. 18

Fig. 20—Same as Fig. 18 but quenched from 1560 degrees Fahr.

Fig. 21—Core structure of same material as Fig. 20

Fig. 22—Same as Fig. 18 but quenched from 1600 degrees Fahr.

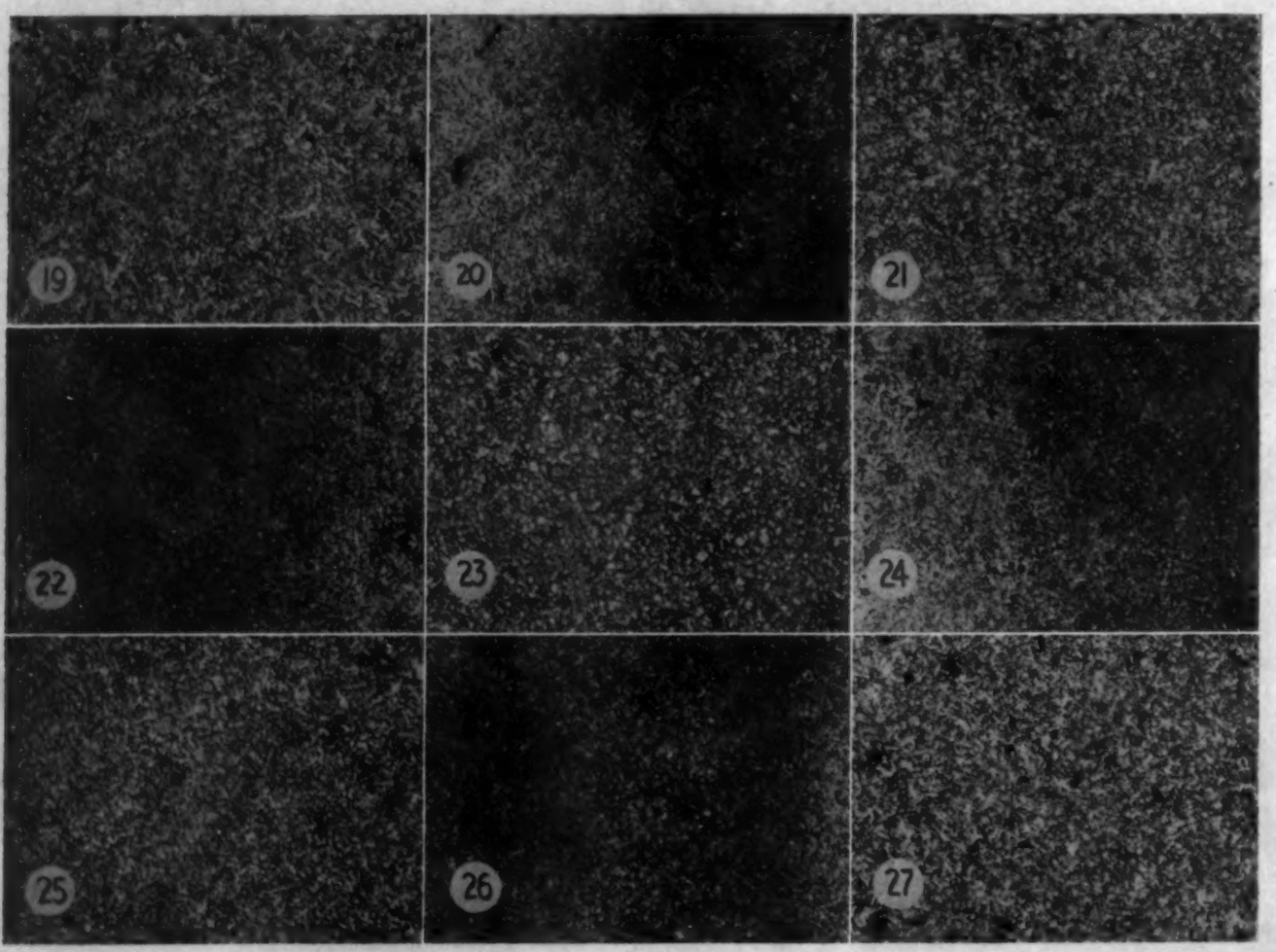
Fig. 23—Core structure of same material as Fig. 22

Fig. 24—Case structure of NE-9430 oil quenched from 1560 degrees Fahr. and drawn 3 hours at 400 degrees Fahr.; at 100 diameters

Fig. 25—Core structure of same material as Fig. 24

Fig. 26—Case structure of NE-9430 quenched from 1580 degrees Fahr.; compares with Fig. 24

Fig. 27—Core structure of same material as Fig. 26



Here at last . . . the answer to Corrosion Problems

ANTI-CORRODE

New Liquid Safeguard Developed by Cities Service

Anti-Corrode, Proved Perfect by Months of Laboratory Testing, Meets Severest Corrosion Requirements. It's Easy, Economical to Apply.

After months of laboratory research and rigorous service tests, Cities Service takes pride in announcing the development of a new and *completely effective* corrosion preventive—Anti-Corrode.

This new liquid safeguard, by virtue of its special properties, and its reasonable cost, is hailed by many engineers as a perfect answer to the vital problem of metal conservation that American industry faces today.

METHODS OF APPLICATION

Anti-Corrode can be applied to raw stocks, finished parts, or to complete machines during storage, assembling or shipping. It is easily applied by dipping, brushing, rubbing, hand or power spraying—and provides a safe film which does not harden, become brittle or crack.

WEATHERING

Anti-Corrode is not affected by rain, salt air, oxygen bearing moisture, etc.

ODOR

Anti-Corrode has no disagreeable odor.

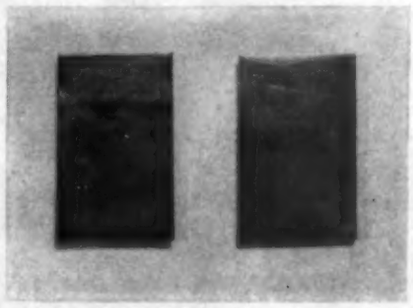
CHEMICALLY INERT

Anti-Corrode is chemically inert to ferrous or non-ferrous metals. Therefore, it can cause no injury to any metal to which it is applied or with which it may be brought in contact.

FINGER STAINS

Surfaces coated with Anti-Corrode can be handled freely without danger of rust spots caused by hand acid.

ANTI-CORRODE MEETS U. S. NAVY TEST



BOTH STRIPS of freshly ground steel pictured here were immersed for 20 hours in a 3% salt solution. Strip on left was untreated; strip on right, coated with Anti-Corrode, shows no trace of rust. (Even after 90 hours of immersion Anti-Corrode coating still resisted rust.)

A LUBRICANT, TOO

Anti-Corrode is compatible with drawing compounds; there is no need to remove it from metal about to be drawn, stamped or otherwise formed.

IDEAL FOR MANY USES

Anti-Corrode can be used on almost every kind of metal or metal equipment—*indoors or outdoors*. Fencing, piping, tubing, wire, wire mesh, girders, sheet metal, metal stock, machinery, trucks, spare automotive parts, tools, metal containers—all need the protection of this new corrosion preventive.

ECONOMICAL

In accordance with regular U. S. Navy Test procedure, Anti-Corrode proved far superior to other leading anti-rust compounds costing as much as 25% *to* 40% *more per gallon.*

Whatever metal equipment you may have, you owe it to yourself to investigate the money-saving advantages of Cities Service Anti-Corrode. (One gallon of Anti-Corrode protects approximately 1200 square feet of sheet metal.) Send the coupon below for further information on how to obtain an adequate sample of Anti-Corrode FREE.

CITIES SERVICE OIL COMPANY
Room 1398
Sixty Wall Tower, New York.

Gentlemen: I'd like to test Anti-Corrode on my own equipment FREE OF CHARGE. Send me the details.

Name_____

Title_____

Company_____

Address_____

OIL IS AMMUNITION—USE IT WISELY!

CITIES SERVICE OIL COMPANY
NEW YORK · CHICAGO

CITIES SERVICE OILS — ONCE-ALWAYS

THE YOU SOUTH
ARKANSAS FUEL OIL COMPANY
SHREVEPORT, LA.

INDUSTRIAL EQUIPMENT

End-Dump Hopper

H. L. Pitcher Co., Detroit, is offering a new model No. 4004 automatic end-dump hopper on casters adaptable for handling of sand, gravel, coal, stamp-

ings, small castings and all kinds of scrap and refuse.

In use, when the latch is released and the load is dumped the bucket is so balanced that it automatically returns and latches in position when reloaded. It rides empty in the balanced position.

Hopper is of structural steel and heavy plate—it is designed to fit any kind of lift truck but may be built to specifications as to capacity and yardage content.

Dust Control

Dust Control Division, American Air Filter Co. Inc., Louisville, Ky., announces a new type N Roto-Clone bench for use in safety burring, filing and flexible shaft grinding of magnesium. Unit provides a semi-enclosed bench assembly with down draft ventilation through wood grilles and is furnished complete with tool shelf, fluorescent lights and partitions between stations.

Distinguishing features of the dust unit are the elimination of all restric-

tions, ledges or recesses where damp magnesium dust can be deposited. The magnesium dust is precipitated and stored under water—none of the particles can pass to the drain, since any overflow consists only of excess make-up water that might be required of magnesium, and water is automatically vented whether fan is stopped or in operation.

The benches are made in a wide range of sizes with capacities from 1000 to 20,000 cubic feet per minute. In addition small individual units which can be located directly in back of magnesium grinding stands also are available. Inlets are placed so exhaust ducts are short and run directly into the collector.

Riveting Tool

Cleveland Pneumatic Tool Co., Cleveland, announces a new tool—the Riv-N-Jector—which is claimed to speed up the number of rivets driven per minute and reduces the amount of waste rivets by 90 per cent. It not only eliminates the reason for dropped rivets but relieves the worker from the tedious juggling of a handful of rivets.

The worker is always supplied with

an ample supply of rivets and avoids repeat trips to the rivet center.

Designed to be easily handled by women operators, the unit is light, and has a magazine holding up to 50 rivets. A special nose jaw holds a rivet ready at all times to insert into the hole of the metal as easily as pointing a pencil at the same hole, the company reports.

Electric Tool

H & H Research Co., Detroit, announces a new push-and-pull action portable electric tool for use in filing, burring and chamfering; honing; polishing and lapping; scraping, sawing and sanding. It features a new pistol grip equipped with a finger-control switch, shaped for quick and easy handling.

Fan of the tool, air inlets and outlets are completely redesigned for larger capacity. A spiral wire cord protector prevents the cord from slipping in or out of the unit, or being damaged by sharp turns or twisting. Also a heavier armature is used, and the work spindle is provided with three bushings instead of two, as in the older models.

The new tool is being offered in two models, having different push-and-pull stroke lengths. Model CX provides a

⅜-inch stroke while model EX a ⅛-inch stroke. Rate of stroke is 1000 to 1200 per minute, for either model. Its power is of 30 to 40-pound push or pull at the working end.

Metal Parts Washer

Industrial Washing Machine Corp., New Brunswick, N. J., is offering a new Rotospray industrial washing machine suitable for cleaning such parts as ball bearings, large castings, crankcase parts, nose sections, large cams and gears, impeller shafts, diesel engine blocks and other items.

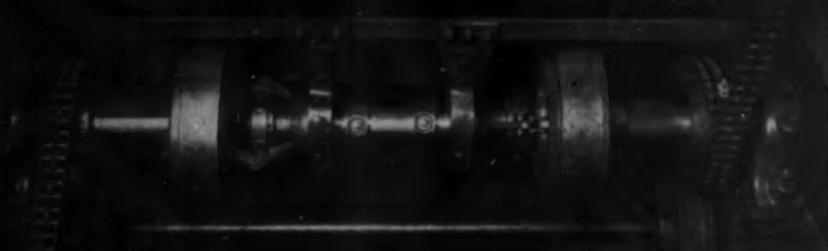
The machine consists of a rotating mesh turntable 2 feet or larger in diameter, housing, pump, motor and spray system. The parts to be cleaned are placed upon the mesh turntable, the door closed and quick-opening valve turned on which allows the cleansing solution to

spray upon the work. As parts are sprayed a gearhead motor rotates the turntable to expose all sides of the work to the spray action which is directed by nozzles from the top, sides and bottom.

After the work has been cleaned, it can be rinsed with fresh water if so de-

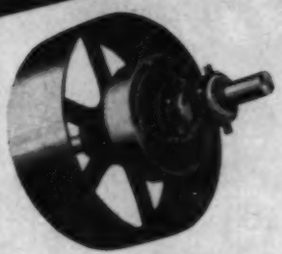
FULL POWER *Control*
FREE POWER *Flow*
WITH STURDY DODGE FRICTION CLUTCHES

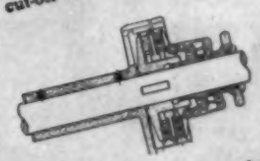
Dodge Solid Friction Clutches in duplex on reversing mechanism of self-propelled hand-reversed Tripper for Belt Conveyor.



DODGE
SOLID FRICTION CLUTCH

Clutch with sleeve, used with pulley, sheave, gear or sprocket. Can also be furnished without sleeve for use as cut-off coupling.





Multiple disc construction reduces pressure required for power transmission. Makes clutch easy to operate. Simple, one-point adjustment provides take-up for any wear on friction surfaces. Compound toggle (on larger sizes) multiplies pressure on shifter; also insures positive release of clutch.

Duplex application: Used for countershaft or machine operations where power is to be delivered alternately to two different points (as in main illustration above). Single shifter engages one clutch or the other.

ADEQUATE control of power-flow over the power "roadbeds" of your plant, will minimize power loss. Rugged Dodge Friction Clutches, stationed at proper places on your line shafts or on your machines, assure positive control, and release capacity loads, without loss . . . delivering more horsepower to production machines, to boost battle power!

The Dodge Solid Friction Clutch is one of several popular Dodge types, outstanding for sturdiness, simplicity and economy. It can be quickly furnished for use as a cut-off coupling or with sleeves for mounting pulleys, sheaves, gears or sprockets.

For power transmission on line shaft or on clutch-operated mobile machinery, you'll find the right clutch for every job in the complete Dodge line. Teamed up with other Dodge Power Transmission Equipment, they put all the power into the job, to maintain peak production.

Nearest Dodge Distributor can help you determine whether Dodge Solid, Split, Expanding Ring or Diamond "D" Clutches answer your purpose . . . or write to

DODGE MANUFACTURING CORPORATION
MISHAWAKA, INDIANA, U. S. A.

Dodge Diamond "D" Friction Clutches

High precision, extremely rugged, compact, simple, fully enclosed, protected against dirt or dust whether engaged or disengaged. Generous safety factor above rated capacity, for momentary shock loads.

Dodge Expanding Ring Friction Clutches

A machinery clutch . . . compact, rugged, extremely simple, fully enclosed for protection against dust or dirt. Convenient one point self-locking adjustment. Suitable for a wide variety of light machinery applications.

Dodge Solid Friction Clutches

Friction disc type, adapted for general power transmission service as well as many types of machinery applications. Rugged, simple in design, easy to adjust and maintain. Widely used on machinery subjected to severe service.

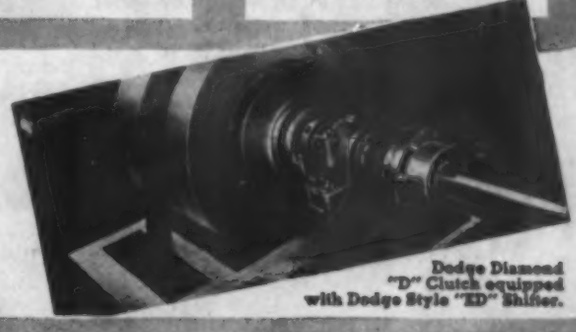
Dodge Split Friction Clutches

For severe, continuous power transmission service on big installations. Particularly suitable for large shafts operating at slow to medium speeds. Split construction permits easy installation on shafting already in place. Parts interchangeable for replacements.

DODGE
MISHAWAKA

THROW ALL YOUR SCRAP INTO THE FIGHT! BUY MORE WAR BONDS!

THE RIGHT DRIVE FOR EVERY JOB



Dodge Diamond "D" Clutch equipped with Dodge Style "ED" Shifter.

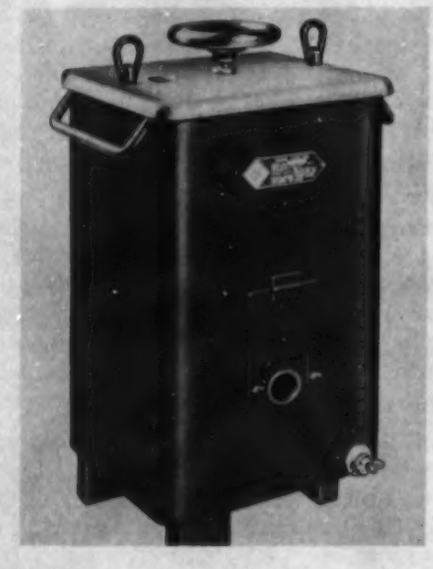
PUT *ALL* YOUR POWER IN THE JOB

sired. The water does not drain into the solution tank, but passes directly to the sewer by means of a tilting drain plate which is coupled to the fresh water valve handle.

New AC Welder

Allis-Chalmers Mfg. Co., Milwaukee, announces a new Ampac "200" welder said to introduce an important forward step in alternating current welding.

Described as the welder with the ideal operating curves, the Ampac "200" is reported to give the operator correct voltage automatically for the continuous range of currents available, rather than using an almost constant voltage at all current settings. This adjustment simplifies welding at low currents because of the high striking voltage, but saves



power when welding at high currents because the voltage is low, it is stated.

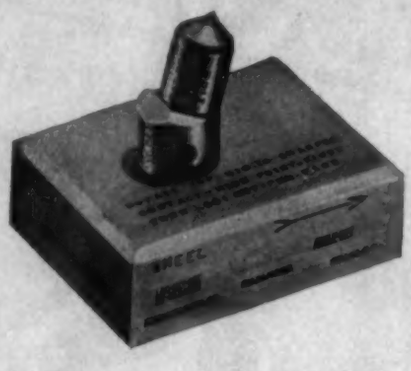
Other special design and operating features of the welder include the new integrated reactor-transformer construction which provides the high, yet safe voltage for easy welding at low currents; active duty from every line of flux . . . assured by reactor coils which surround the variable air gap; and simplified construction using fewer working parts.

The unit handles rods 1/16 to ¼-inch in size, for thin sheets or heavier plates. Most direct-current rods as well as all alternating-current rods can be used, the company says.

Magnet Block

Diamond Tool Co., Chicago, announces a new "Angle-Set-magnet-block" for magnetic chuck grinding—a further development of the "Angle-Set" tool to adapt it in combination with the "Magnet-Block" for accurate diamond dressing of surface grinders.

The unit is designed for wheels up to



8 inches diameter, however, larger diamonds can be set in it for larger wheels.

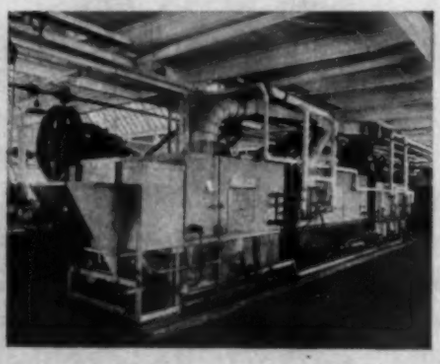
The dresser comprises three units, the "magnet-block" 2½ x 3 x 1, containing a 12-degree "Angle-Set" fitted with a Big-Hed nib containing a No. 10-CNX (1¼ carat common quality) diamond.

Pickling Machine

Howard Engineering & Mfg. Co., 1848 Freeman avenue, Cincinnati, is offering a new pickling machine which steps-up cleaning in shell production. It is designed to conserve manpower and critical materials, as well as to speed pickling output.

Actual operations reveal the machine is capable of pickling a maximum of roughly eight thousand, 37 millimeter shell cases per hour.

Parts to be cleaned travel through the machine in a drum which varies in diameter between sections, so each section of the drum runs in its particular tank. Scale is removed from annealed parts by successive pickling, rinsing, neutralizing and rinsing operations. A variable speed



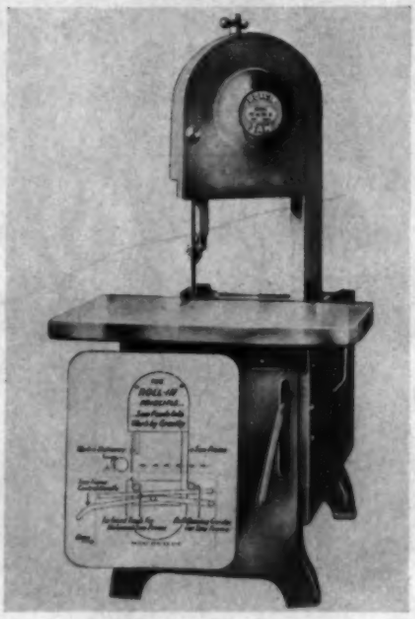
drive provides necessary changes in the pickling time.

Acid, rinse and neutralizing solutions are picked up by scoops on the side of the drum, and are dumped by the scoops on the parts. The machine is 35 feet long, 8 feet wide and 9 feet high. To withstand acid corrosion, the pickling and first rinse drums are of monel metal and the tanks are lead-lined. The machine is available in special sizes and can be adapted to the pickling of parts other than shell cases.

Cutting Bandsaw

Universal Vise & Tool Co., Parma, Mich., announces a "Roll-In" metal cutting bandsaw, featuring a new gravity feed principle. According to the company, the saw blade feeds into the work through movement of a balanced blade wheel frame on an inclined track.

Blade pressure is regulated automatically by texture and degree of hardness of metal being cut. Saw may be used for cut off, trim and contour work. A



swivel block for holding work can be removed for contour jobs or long straight cuts.

The machine features three speeds—81, 161 and 264 feet per minute. Its saw blades are 8½ to 9 feet long. In cutting into the work, the saw cuts vertically and down, the blade traveling 7 inches into the work.

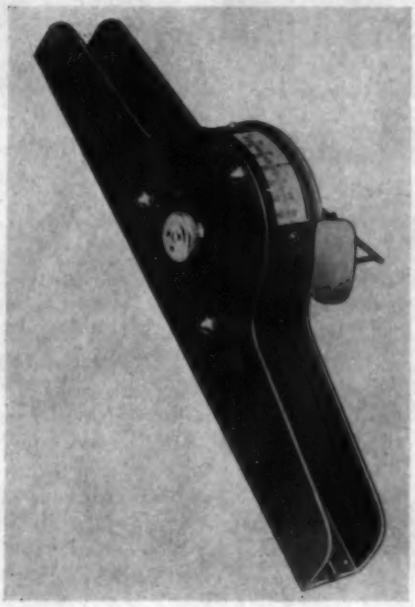
Angle Gage

Engis Equipment Co., Chicago, announces a new vernier angle gage called the Clinometer, recommended for general purposes wherever angles and inclinations must be checked. It is used on various types of machine tools—lathes, drill presses, shapers, gear hobbers, etc., and for test setups in the inspection room, it is said.

Precision measuring of angles and inclined surfaces is accomplished by the unit's new gravity mechanism. The action of the instrument is by a free swinging drum graduated in 360 degrees which is

supported by ball bearings. When the device is applied to an inclined surface, the drum swings to a position which brings its center of gravity under its center line. The degrees of inclination can then be read from a pointer located above the drum. Minutes of the arc are indicated by a separate Vernier scale; repeating accuracy has been tested to a precision of 7½ seconds, reading accuracy to one minute.

Reading is facilitated by a patented brake mechanism, and by an attached magnifying glass which enlarges both the degree scale and the vernier scale. Through a hand knob brake, the rotating drum can be locked in position; in consequence, a reading can be taken after the instrument has been removed from the measured surface. The instrument is not sensitive to shock, and can be used in all temperatures. In the aviation field, the maker states, the Clinometer has been used successfully in the manufacture of propeller blades, for the checking of wing sections, tail sections, ailerons and fuselages, both during production, assembly and on the complete plane. The instrument is being offered in five models.



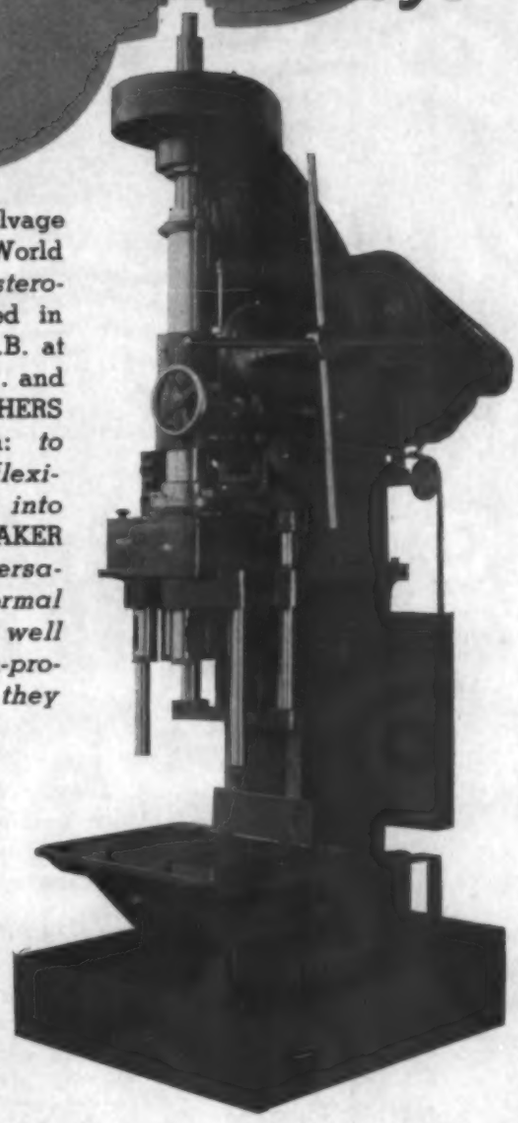
Photoelectric Protection

Photoswitch Inc., 77 Broadway, Cambridge, Mass., announces a new photoelectric system which projects a fence of invisible light over distances as great as 1500 feet and gives instant local or central-station alarm if an intruder enters the protected plant area.

In operation, light source is aligned with receiver to which it focuses a modulated beam of infra-red light. Because the receiver responds only to the frequency of light emitted from the light

you won't HOG ISLAND this baby!

HOG ISLAND — famed salvage Mecca that followed World Conflict No. 1—where the *sterotyped* machine tool, bathed in grease, bore its second F.O.B. at a fraction on the dollar . . . . and from which BAKER BROTHERS drew a lesson in design: *to incorporate the maximum flexibility of machine design into all tools bearing the* BAKER *nameplate, that their versatility may provide for normal peace-time production as well as the specialized high-production units for which they were purchased.*



ARMY E NAVY

FOR EXCELLENCE

On March 20th the loyalty, skill and diligence of the employes at Baker Brothers were recognized with an Army-Navy Award for excellence in production.

No. 422 EXTRA HEAVY DUTY SINGLE PURPOSE TYPE SINGLE SPINDLE DRILLING and BORING MACHINE

Features: Not only efficient for single spindle drilling, boring and facing operations, but also multiple spindle drilling and boring purposes. (Machine shown is equipped with heavy duty 8-spindle head.) Multi-vee belt drive from motor mounted on pivoted base. Multiple head and spindle assembly counterweighted to allow for raising and lowering without effort. Entire machine mounted in welded steel pan which serves as sump for coolant. . . . Complete details and specifications available in compact bulletin, well illustrated.

BAKER BROTHERS *Incorporated*

TOLEDO, OHIO, U. S. A.

PAGE

GENERAL WIRE

SHAPED WIRE

WELDING ELECTRODES

STAINLESS STEEL WIRE

WAR PRODUCTION AND ARMED FORCES

YOUR WIRE REQUIREMENTS

● That is a pretty good picture of conditions in the wire business today . . . More wire, more Shaped Wire, more Stainless Steel Wire, and more Welding Electrodes than ever before in the history of America . . . And less, where there is any, for your civilian needs.

● *So continue to buy wire carefully. Be "Scotch" about it. And if you are planning production that must await peace, we are more than willing to work with you on any of the jobs that call for the use of wire.*

PAGE

FOR WIRE

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco, Portland

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

source, it is not affected by other artificial light or by daylight. This, it is said, permits extreme sensitivity, enabling the equipment to function over a greater range than it has been previously possible. If invisible infra-red light is not

required, the operating range of the system exceeds 2000 feet.

Within the light source, a fan driven by a gearless, brushless motor, serves as a light chopper to produce rapidly fluctuating light of the desired frequency, and also cools the heavy-duty lamp.

Once the invisible beam of light projected to receiver is momentarily broken, the alarm circuit latches in operation. An additional safety feature is that either power or tube failure will cause the alarm circuit to operate as though the light beam had been broken. Both the receiver and light source are of rugged construction, and are furnished in weather-proof housings. The equipment is designed for operation on 105 to 125 volts alternating current.

Extractors

Reps Tool Co. Inc., 99 Wall street, New York, is offering double purpose extractors which are said to remove stub ends of pipe, nipples, tubes, bolts or

screws. Units are of forged tool steel with heavy square shank followed by a sharply tapered, short, reverse thread ending in a square reaming end.

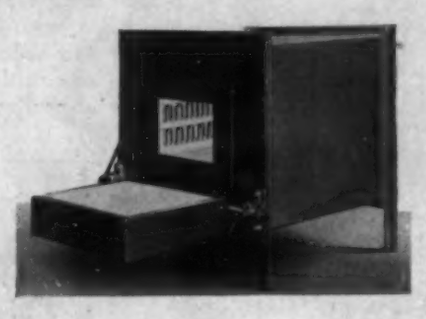
Simply by inserting the tapered end in the stub of pipe, tube, or drilled screw or bolt, without any hammering or other preparatory steps, a powerful four-point

grip is obtained. It is emphasized that this shallow, multiple bite greatly lessens expansion and jamming.

The built-in square reamer automatically removes burrs, eliminating interference with the extractor's bite. Continued increased pressure of a wrench on the squared shank positively pulls the broken piece back outward on its threads. Ten cadmium plated extractors make up the set and cover the entire range of pipe from ⅛ to 2 inches and bolts or screws from ⅜ to 3½ inches.

Electric Furnace

Harold E. Trent Co., Manayunk, Philadelphia, announces a new electric tool room furnace for hardening, annealing and heat treating operations. Known as type MLR-4 bench furnace, it has heat-



ing elements of folded and formed nickel chromium ribbon units.

Outer casing of the furnace is of steel reinforced and lined with different layers of insulation. The quick-acting, lever-operated steel door is brick lined, and can be used as a loading table. The furnace can be controlled either manually or automatically.

Limit Switch

General Electric Co., Schenectady, N. Y., announces a new lightweight, dust-tight limit switch specially designed for use where space is limited such as in aircraft. It features a contact mechanism of the snap-action, double-break type which gives it a high current rating making it also suitable for applications where severe vibration conditions are encountered.

Designed for use in a wide range of ambient temperature—from 95 to —40 degrees Cent—the switch is corrosion-proof and can be used at altitudes from sea level to 40,000 feet. It is a spring-return, plunger-operated type with a 7/32-inch overtravel. It can be mounted either on the cover side or on the opposite side. It is being offered in three different contact arrangements—single-circuit, normally open; single-circuit normally closed; and 2-circuit, normally open and normally closed.

GREEN HANDS
can produce Top Quality!

Shortages of trained workers no longer need mean any let-down in the quality of manufactured products. Warplants now are demonstrating that new high standards can be rigidly maintained through systematic application of Foxboro Measurement and Control Instruments.

With these production aids, exacting operations are reduced to routine . . . even "green hands" can produce surely and accurately. Automatically, workers are supplied with exact measurements to guide them . . . graphic records are provided wherever needed . . . manual control is often completely replaced!

For post-war planning, take a tip from war industries. Learn how Foxboro Instruments can assure higher uniformity and quality in any process requiring critical temperatures, pressures or flow rates. The Foxboro Company, 118 Neponset Avenue, Foxboro, Mass., U. S. A. Branches in principal cities of U.S. and Canada.

"For outstanding production", The Foxboro Company has been awarded the Army-Navy "E" Pennant.

FOXBORO
Reg. U. S. Pat. Off.
MEASUREMENT AND CONTROL SYSTEMS

Plant-wide Foxboro Instrumentation insures rigid quality maintenance in aviation gasoline and synthetic rubber production.

Automatic control of dye-roll pressure by Foxboro Pneumatic Loading Systems like this eliminates uneven dyeing of textiles.

There Is No Substitute For *Results*

It is a principle of logic that every "effect" must have a "cause." In judging a product (the cause), you've got to look to the results it produces (the effect) to determine its true value in relation to others in the same field. If the results are superior then it is only logical that the product, too, must be superior in construction and engineering design.

That reasoning is especially true with airless Wheelabrator blast equipment, because the results it produces are unequalled in the field of blast cleaning. A test will show why that is true.

WHEELABRATOR The Original AIRLESS BLAST EQUIPMENT More than 2000 in Use

PROBLEM CLEANING 6 TO 8 TONS OF VARIED SIZE CASTINGS HOURLY

SOLUTION WHEELABRATOR SPECIAL CABINET USING 2 WHEELABRATOR UNITS

RESULT 95% OF FOUNDRY'S ENTIRE PRODUCTION CLEANED IN ONE MACHINE

Thorough cleaning of castings weighing from one pound to one ton—approximately 95% of the production of green castings—is obtained with the Wheelabrator Special Cabinet at Spring City Foundry Co., Waukesha, Wisconsin. Nearly half the total tonnage passes through the Cabinet a second time to remove scale after heat treating.

Castings are carried into the cabinet on the mono-rail conveyor at the rate of 40 hooks per hour. Only one pass through the Cabinet is required to remove every trace of foundry sand or scale from all corners or pockets of intricate shaped castings.

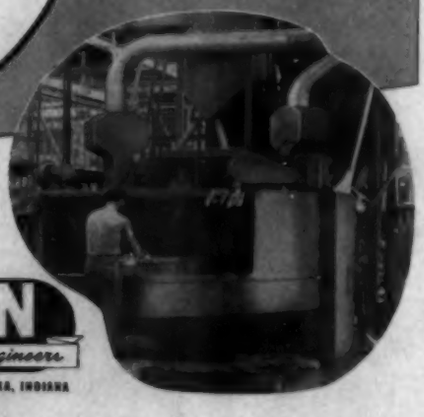
PROBLEM SPEED UP CLEANING OPERATIONS

SOLUTION INSTALLATION OF A 48" x 42" WHEELABRATOR TUMBLAST

RESULT CLEANING TIME DECREASED 66-2/3%

Whereas 30 minutes had been required to clean 500 pound loads of hard iron and annealed permanent mold castings with inefficient blast barrels at the Elmira Foundry Co., Elmira, N. Y., only five minutes are now needed to handle a larger quantity of the same work in the 48" x 42" Wheelabrator Tumblast.

2300 pound loads of exceptionally difficult to clean heat treated bearings are Wheelabrated in less than one-fourth of previous time necessary. Savings of several dollars per ton have also been realized due to the faster cleaning resulting.



ARMY E NAVY

AMERICAN FOUNDRY EQUIPMENT CO.

Blast Cleaning and Dust Control Engineers

109 SOUTH DIXBIT STREET • • MISHAWAKA, INDIANA

300% Tool Life Increase

(*Continued from Page* 104)

but the greatly increased life obtained by the Lundbye process is a definite advance. The following will indicate the results obtainable:

In addition to *Collier's* and *The American Magazine*, Crowell-Collier Publishing Co. prints *Women's Home Companion* at the Springfield, O., plant. Here over a million periodicals are turned out every day. Thus it has widely utilized nickel electrotypes to print as great a number of copies as possible from each set of plates, nickel giving a longer life than the regular uncoated copper electrotypes.

Fig. 2 shows results of a trial run comparing conventional nickel plated electrotypes and chromium processed plates. These were used by Rumford Press, Concord, N. H., to run off the blue color matter on the title page (page 1) of the January 1943 issue of *The Readers' Digest*. The nickeltype was made in the conventional manner by pouring the lead-antimony backing against the copper plate which was produced by electroplating against a wax form made from set type, rules and cuts. This was then nickel plated. After running off 300,000 copies of the issue, the nickeltype was so badly worn that it could no longer be used. As can be seen by close examination of Fig. 2, the edges of the characters are rounded off, no longer make sharp ink impressions.

TABLE II—Some Cutting Tool Applications and Results of Comparative Performance Tests

Type of Tool	Maximum % Increase In Tool Life
Reamers	2,000
Drills	1,300
Tool bits	1,200
Forming tools	900
Taps	3,000
Counter bores	600
Milling cutters	600
End mills	550
Files	100
Hobs	960
Dies, punches	1,100
Special cutters	435
Thread chasers	750
Broaches	400
Cut-off saws	100
Fellows gear cutters	300
Spot facers	400
Gear cutters	100
Circular saws	250

A duplicate plate made in the same manner except finished by plating by the Lundbye process ran off the remainder of the copies needed—1,300,000—and is still in perfect condition. It is estimated that it could be used for a run of 5,000,000 copies. That is a performance ratio of better than 16 to 1 for the chromium processed plate.

As a result of this test the Crowell-

Collier Publishing Co. is changing over its nickel-plating plant to the new process as fast as possible. With runs of 5,000,000 copies now in sight, the process makes it possible to print any magazine from a single set of plates, thus cutting engraving costs and saving press time formerly required for changing plates or electrotypes.

Material Substitutions: Indicating the possibilities of the process in making substitute materials do the work of hard-to-get materials is the experience of the South's well known shipbuilder, Higgins Industries Inc. Many of the boats made by this company are equipped with a pump formerly fitted with an impeller shaft of "K" Monel. With the increased difficulty of obtaining Monel, it was necessary to find a substitute. The shafts are 1¼ inches in diameter, 24 inches long. Of this length, the most critical portion is an area of 1½ inches long where a packing gland fits tightly.

Ordinarily an application of this type could well be handled by a bronze shaft. However, service conditions to which this unit is subjected are unusually severe in that they include continuous operation for long periods without any water to lubricate the impellor shaft packing gland. To prevent air leaking while the pump is running dry, graphite packing is tightly pressed against the shaft for 1½ inches along the shaft length.

Of course, there are several possible substitutes that could be employed. The difficulty with most of them was that they were just as hard to obtain as the Monel. Ordinary bronze wore rapidly and was entirely unsuitable, yet this was most desirable from the supply point of view. Accordingly several bronze pump shafts were sent to the Crowell-Collier plant for sample processing. Their tests showed them entirely satisfactory.

Immediately Vice President A. J. Higgins Jr. telephoned to Springfield asking for complete engineering details to start up a plant for processing the shafts at his own works. Fifteen minutes later a complete plating plant design was on the way by air mail. This was on a Friday. The following Tuesday morning the chromium processing department was in operation.

Mr. Higgins comments, ". . . . it has overcome one of our major difficulties in finding a suitable substitute for Monel metal which is so critical at this time". This substitution has received government okay and many other similar substitutions for critical materials have likewise been approved but cannot be described at this time due to wartime restrictions. It can be said, however, that

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In 1920, most folks had no money in their pockets. In 194X they will have their pockets full. Quite a difference, you'll agree.

First it spells—"Postwar Opportunity"—because when this war is over there will be, in the United States, the two things it takes to create plenty of business—*money and markets.*

The increase in bank accounts and the buying of war bonds is building up the greatest potential of purchasing power that any nation in the world has ever seen.

When this war is over, our people will have billions in money and a lot of worn-out, obsolete household equipment: refrigerators, radios, and vacuum cleaners, and of course—automobiles.

There will be furious competition, but the business will go to those concerns who have retained this basic principle of merchandising—"Give *more* people the *most* you can for their money."

This can be done by utilizing in peacetime products the new production techniques, new materials and new uses of old materials developed and perfected by the impetus of war.

Industry has learned how Management Engineering can be applied to this job, and has called upon organizations like ours . . . The Trundle Engineering Company . . . to help it secure these advantages in its manufacturing operations.

Geo. D. Trundle Jr.
President

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Long in popular demand in metal working plants, the sale of Monarch lathes has received a tremendous impetus during recent years.

Repeated enlargements of plant have been necessary and upon completion of each new building additional Euclid Cranes have been installed.

Today ten 10-ton Euclids are operating "around the clock" —moving heavy lathe beds—stepping up assembly—speeding finished lathes toward the shipping platform and production fronts throughout the world.

Euclid Cranes and Hoists are privileged to be partners in production with leaders in all principal lines of manufacture—in normal times and now in increased measure during the war program.

Continued acceptance by leaders of industry—men who know and build machinery of the highest calibre—gives assurance that Euclid Cranes and Hoists serve with the utmost efficiency and satisfaction.

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the process is in wide use in government arsenals, and many other important war production plants.

Test It Yourself: The company's offer still stands—any plant doing war production work can send in to Axel E. Lundbye, chief engineer, Crowell-Collier Publishing Co., Springfield, O., sample cutting tools or other work which will be processed without charge. A report on their performance compared with untreated tools is the only thing asked. To any company that wishes to use the process, Crowell-Collier executes a royalty free license for use on war work, sends complete plant design details and will help train your own men to run it—all without charge—in an effort to further our country's war production efficiency.

In order to furnish a design for a plant to handle the process, it is only necessary to tell Mr. Lundbye how many tools are to be handled per day and the size of the biggest tool. Then wiring diagram, generator requirements, tank layouts and complete description of procedure can be on the way in a few moments if necessary. Hundreds of these designs have already been sent out and are now in use all over the country.

Origin of Process: The Crowell-Collier Publishing Co. maintains one of the largest continuous production plants in America at Springfield, O., where three 8-hour shifts manufacture more than a million magazines a day. At the outbreak of World War II, the installation of eight giant roto-gravure presses had just been completed for printing fast color work.

Highly volatile ink is spread on the surface of large etched copper cylinders of these presses and the excess scraped off by a "doctor" blade—a long steel blade comparable to a razor blade except that it is 72 to 76 inches long, just a few inches wide and 0.006-inch thick. Under 1000 pounds pressure, this blade oscillates across the face of the rapidly revolving cylinder a distance of 2½ inches at a rate of 30 strokes per minute. As can be imagined, this severe service demands the very best steel obtainable. These eight presses employ 53 roto-gravure units—said to be the largest such installation in the world—so maintaining these doctor blades in perfect shape not only involves a maintenance problem but new ones must also be available for replacement.

These doctor blades have always been made of the best Swedish blue-tempered spring steel, analyzing 0.95 to 1.05 per cent carbon with phosphorus limited to between 0.015 and 0.025 per cent, sulphur from 0.005 to 0.015 per cent. Even before the outbreak of hostilities in 1939, the company had anticipated difficulties

in obtaining this material and had sought a satisfactory substitute. Careful spectrographic analysis of the Swedish steel and various American-made steels resulted in locating several equally as good. But these high grade steels were also hard to obtain due to the tremendous demand. They were being sent to Great Britain and her allies even before the United States entered the war. Thus the company was no better off than before. The discovery of some method of prolonging the life of these doctor blades was a "must".

Accordingly, a program of intensive research was started under the direction of Axel E. Lundbye, chief engineer. Everything was tried—all through the ferrous metals down to the nonferrous; rubber, synthetic and natural; plastics of all kinds and descriptions—but with no success. Some of the materials were actually dissolved by the inks.

Then Mr. Lundbye went back to some experimental work on chromium plating he had done in Copenhagen, Denmark, in 1913 (he is a Dane by birth, now a citizen of the United States). He had carried on considerable additional research since that time. In the course of this new investigation, a method was discovered by which chromium plating could be made an integral part of the underlying material. As will be explained in discussing the characteristics of the finish, this is something new, for usually chromium plates are characterized by an extreme brittleness that renders them entirely unfit where shock loads and high unit pressures are involved.

A number of doctor blades were given treatment by the new process. Their life was found to be increased from the usual 8 hours to a point where now they need not even be examined until the issue is off the press—a minimum of 110 hours (per week). After this 110-hour run, the blades are removed from the press and trued up by just "kissing" them with a grinding wheel to remove a maximum of about 0.01-inch. Thus after 100 weeks' operation, only 1 inch has been removed from the blade width. Edge of blades is ground square, not a knife edge.

This performance compares with the former 6 to 8 hours' service after which it was necessary to remove about 0.110-inch in truing up the blade. This consumed 1 inch of blade width in only 50 to 75 hours of press time—more than an inch per issue. Obviously the doctor blades did not last long at that rate. Treated blades are now good for at least 100 weeks' service.

In addition to this 1380 per cent increase in performance of the blades it formerly was necessary to shut down the

Wyckoff production soldiers pledge their all-out effort for Victory!

A second star has been added to our distinguished Army-Navy production award!

Wishful thinking never won a marble game or a great war. Only the will and the ability to "Do the Job" has won six American Wars. To help keep our coveted freedom, the contribution of every Wyckoff production soldier will be to do the very best job of "passing war-vital steel" until Victory is won!

WYCKOFF
DRAWN STEEL COMPANY

press for a half hour every 6 to 8 hours while blades were being changed. The treated blades now permit continuous operation, saving a minimum of 8 hours press time per week. Since each press represents a quarter million dollar investment, eliminating these frequent shutdowns has resulted in an important saving by permitting increased utilization of the equipment.

Cutters: After company engineers had satisfied themselves that the process worked on doctor blades, they tried it on cutting tools. Quite a large machine shop is an essential part of this plant and this became their proving ground. The result, to their knowledge, was the first successful treatment applicable to all types of cutting tools, for their work showed an average *increase in production* of 33 per cent made possible by higher speeds and feeds. This was considered of sufficient value to report to Donald Nelson of WPB and other groups. As previously detailed, the process has now been tested and adapted by hundreds of plants.

An anlaysis of the characteristics of the plate produced by this process and a complete description of the equipment and procedure employed will be included in the second section of this article.

(Concluded Next Week)

1½ Pounds of Meat Enough for Hard Worker

One and one-half pounds of meat a week is enough to maintain the health of any hard-working man, provided a variety of other foods is included in the day's meals, according to the National Research Council's food and nutrition board, Food Distribution Administration, Nutrition in Industry Division, United States Department of Agriculture, Washington.

Such foods should consist of poultry, eggs, fish or cheeses; wholegrain or restored cereals, bread, peas, dried beans, lentils, soybeans, peanuts or nuts; green and yellow vegetables; fruit and milk, the board states.

Present ration allowance is sufficient to provide from 2 to 2½ pounds of meat, and appreciably more if one meal a day is eaten in a cafeteria or restaurant.

"It would help workers to make the necessary adjustments in their food habits if they realized there are foods other than meat which provide protein for muscle building and body repair," says Dr. Robert S. Goodhart, chief, Nutrition in Industry Division. "Some workers do not seem to realize that poultry and fish are as valuable sources of protein as the rationed meats."

An ounce and a half of chicken has more protein value than 1½ ounces of lean beef, Dr. Goodhart says. Halibut has nearly as much protein value as lean beef. A glass of milk provides 87½ per cent as much as 1½ ounces of lean beef.

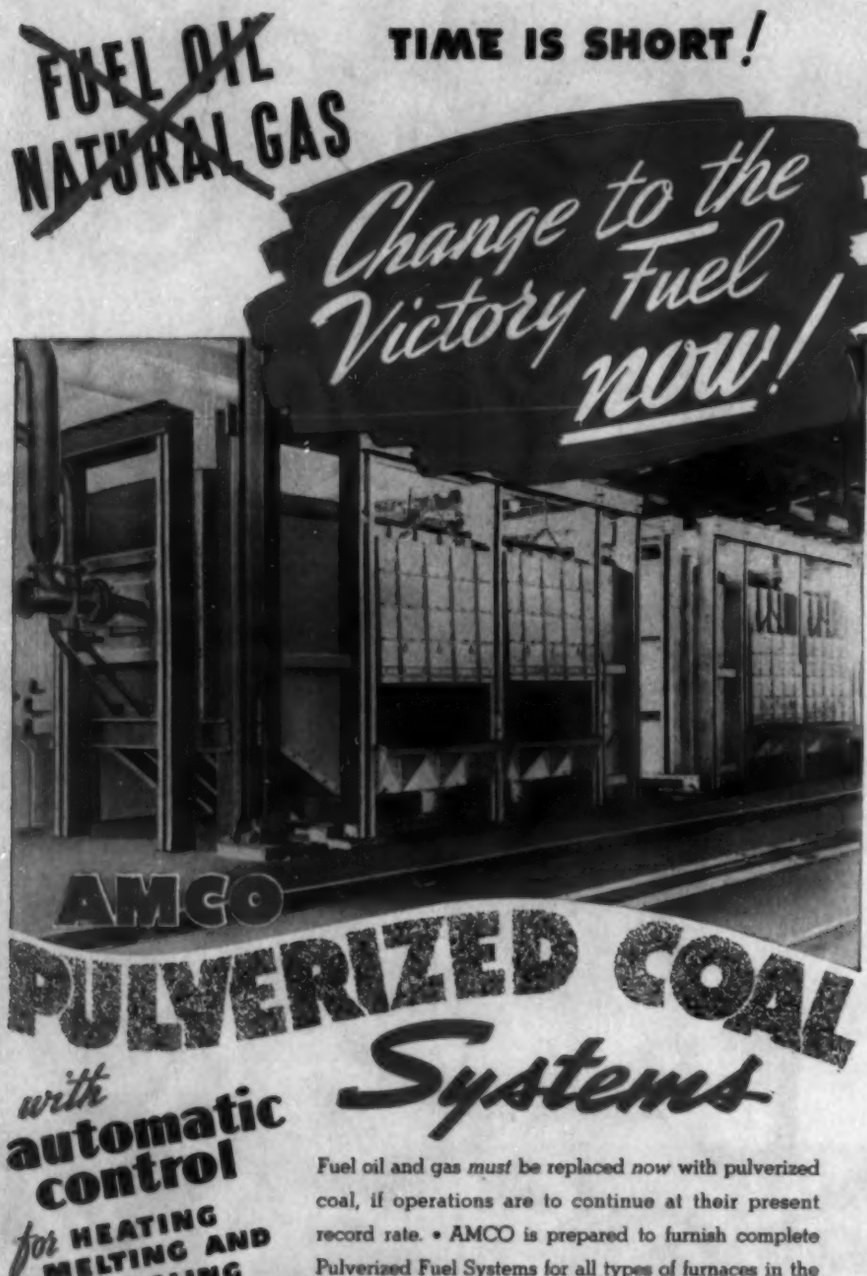
Introduces New Victory Wrinkle Finishes

A new line of Victory wrinkle finishes, containing no Chinawood oil is reported by Maas & Waldstein Co., Newark, N. J. Finishes in the line closely resemble standard finishes, the manufacture of which is now restricted.

According to the manufacturer, the new finishes form hard, durable coatings, cover rough metal surfaces effectively in a single coat and are applied in regular wrinkle patterns by the same methods. These are being offered in a full range of colors.

Starts Sintering Plant

A sintering plant, with a rated capacity of 1500 tons a day, was placed in operation recently at the Hamilton works of American Rolling Mill Co. The sintering unit was authorized by the Defense Plant Corp. it is reported.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Sintering-Plant Design

(*Continued from Page* 114)

can be increased and sinter quality improved by the use of an increased percentage of good quality return material. The sintering rate is dependent upon the possible rate of fuel combustion consistent with the necessary transmission of heat to the materials to be sintered. The preferred percentage of return material in the mix is that percentage which will permit the most rapid sintering rate; the critical percentage is that beyond which there is no compensating increase in the sintering rate.

Size of Returns Vary

Preferred particle size range of return material is a variable dependent upon the particle size range and other physical characteristics of the primary material. It should be of such size to permit homogeneous mixing when pugged with the primary material and one which will permit a minimum of segregation of sizes when the mixed mass is delivered to the sintering hearth. Obviously the percentage of unsintered fines in the return material cannot be of any benefit in opening up the bed of material because those fines are of the same particle size range as the material to be sintered. All benefit must come from that percentage which is larger in particle size than the raw material but to give that benefit the material must remain uniformly mixed when delivered to the sintering hearth. Because of the segregation of particles when the mix is delivered to the hearth, heretofore described, most of the larger particles of the return material will roll down to the bottom of the bed and in that position they cannot give any benefit to the opening of the material above them. The dividing line governing this segregation is the size and weight of particles in their relation to the forces of adhesion and gravity.

In short, there is a percentage of return material between the fines and the oversize which is the optimum size for increasing the permeability of the bed to air. To get enough of this optimum size it is necessary to use a larger percentage of return material than would be necessary if all the oversize particles were reduced to the optimum size. By crushing the oversize to the optimum size the same increase in sintering rate can be obtained from a small percentage of return material as is usually obtained from the use of a large percentage and since the percentage of raw material in the mix is greater with the small percentage of return material production for any given machine would be increased.

Efficient use of return material for making the bed of material permeable to

Jungle waters are purified ... with the aid of a deep-drawn cylinder

Shown below is another of the many products built by Hackney for the war effort. This cylinder is used for transporting and storing liquid chlorine, vitally needed by the armed forces for purifying water supplies in the tropics. This Hackney Cylinder is cold-drawn to specifications. It meets all the strength, weight, safety and handling requirements for this type of container.

Hackney Chlorine Cylinders are used in the transportation and storage of chlorine, bringing it safely to destination over thousands of miles of land and sea. They comply with I.C.C. specifications. These cylinders are made from flat circular plates of steel. By a series of cupping and cold-drawing operations they are formed into seamless cylinders made to exacting specifications with uniform sidewall thickness. The result is a lightweight cylinder, yet one providing adequate strength.

It may be that your war and postwar problems can be solved by Hackney designs and production of special deep-drawn cylindrical shapes. They may prove advantageous for war products you are now making—for improving existing equipment—and in the design of new products for the postwar period. Through use of Hackney Deep-Drawn Shapes, manufacturers have been able to conserve material, man-hours and equipment—assure adequate strength while reducing weight. Write today for all the facts.

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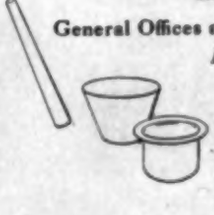
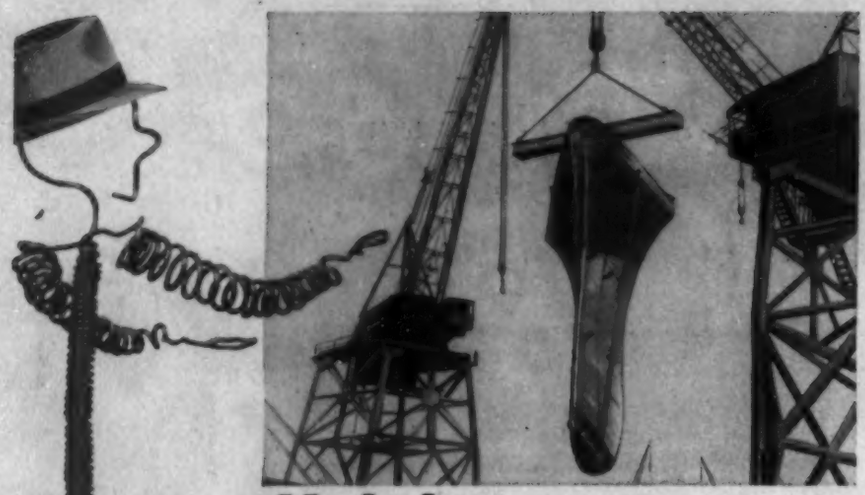


DEEP-DRAWN SHAPES AND SHELLS



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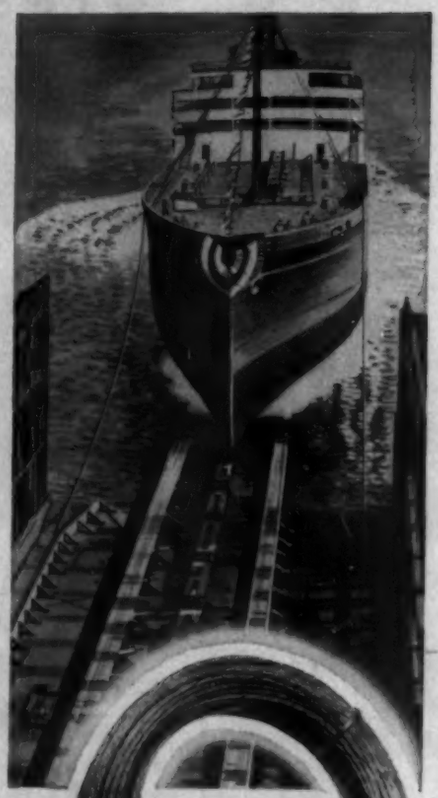
This is just one place where many tons of Keystone's wartime production is going. And too . . . planes, tanks, guns and ammunition place upon us heavy calls for materials.

Keystone wire and rods for *civilian* products must come *second* to these demands—until Victory.



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air can be accomplished by cracking down the oversize particles to the optimum size before feeding into the mix. In the category of materials sintered ⅛-inch size is large enough to serve all purposes of opening up the bed of fine material and small enough to feed uniformily and to hold a position in the stream of material when delivered to the sintering hearth. The optimum maximum size for return material might well be considered ⅛-inch.

Degree of permeability to air of a mass of fine material is dependent upon the size of the interstices of the mass and that size is dependent upon the compactness of the surface contacts between the particles composing the mass. When a coarse material is introduced into a fine material mass for the purpose of increasing permeability, the benefit gained is from a change in the surface contacts of the fine particles and the increase in the size of the voids between particles gives the desired increase in permeability. The opportunity for greatest gain is the introduction of a material just enough larger in particle size to give the best average change in surface contacts. For purpose of illustration a ¾-inch cube will be used as representative of the top size of return material. The total surface area of a ¾-inch cube is 3.375 square inch. If that cube was broken up into ⅛-inch cubes there would be 216 cubes with a total surface area of 20.25 square inches, an increase in surface area of 600 per cent.

Moisture Is Eliminated

A common expression in the sintering industry is "moisture gives porosity to the bed." It does because moisture occupies space and when driven off by heat a void is left and the void permits a free passage of air. Soft earthy ores usually contain approximately 15 per cent, plus or minus, of surface and absorbed moisture and combined volatile matter and the elimination of these volatiles serves to open up the bed of material to a better passage of air. The volatiles of such ores are uniformily disseminated and since much of the moisture is absorbed the ore may be barely damp to the touch. Magnetite concentrates, being of a hard physical structure, will not absorb moisture and all moisture present is on the surface of the concentrate particles and such material will be dripping wet at 5 per cent moisture, or less, and aside from the sulphur present in some of the magnetite ores, this class of material usually is free from combined volatile matter.

In the vernacular of the industry there is a "burning moisture" which may be said to be a moisture content at which ignition is uniform across the top surface of the bed. The limit of this sur-

face moisture content is the percentage beyond which ignition is impossible; absorbed moisture does not affect ignition as the surface moisture does. The soft ore mix, therefore, can carry more moisture than the hard concentrate mix and still have good ignition. The soft mix will get a proportionately greater benefit from moisture in opening up the bed to the passage of air than the hard concentrate mix can get from the lesser amount of moisture carried. To offset the disadvantage a greater percentage of return material usually is needed with the concentrate mix than with the soft ore mix.

To get the greatest benefit from the return material, equipment should be provided to prepare the material to the most desirable size, in relation to the particle size of the primary material, so that the percentage of the returns can be held to a minimum and still approach the benefits of fine dissemination as described from the presence of finely disseminated volatiles in the soft ores.

III—Material Handling Before the Sintering Machine

The problems in this phase of the subject concern construction, operation, and maintenance. For year-round operation weather conditions must be considered. Frozen materials must be crushed or thawed to feed uniformly. Feed bins should be built so that heat can be applied to the bins to thaw the frozen materials before they reach the feed gates.

Any number of bins can be constructed in a line with all feeders delivering their stock to a common collector belt, as shown in the accompanying illustration. Such construction is common, practical, and economical, the principal consideration being clearance and accessibility to feeders, belt pulleys, and driving mechanism.

Turntable, belt, drum, or electric vibrator feeders are all practical. The electric vibrator feeder in this application is too new to be proven in the maintenance factors; of the others the opinion is offered that over a long period of time the turntable will prove to be the most economical in maintenance charges.

Materials Are Pugged

Raw material mixture from the collector belt and the return material from the discharge end of the sintering machine must be brought together for pugging and the arrangement of the equipment for this purpose should be governed by the well-known affect of return material upon handling equipment and upon the service the material must give to the operation. In the early years of sintering ferrous material plants were built to sinter flue dust only and the usual practice was to use current dust supplement-

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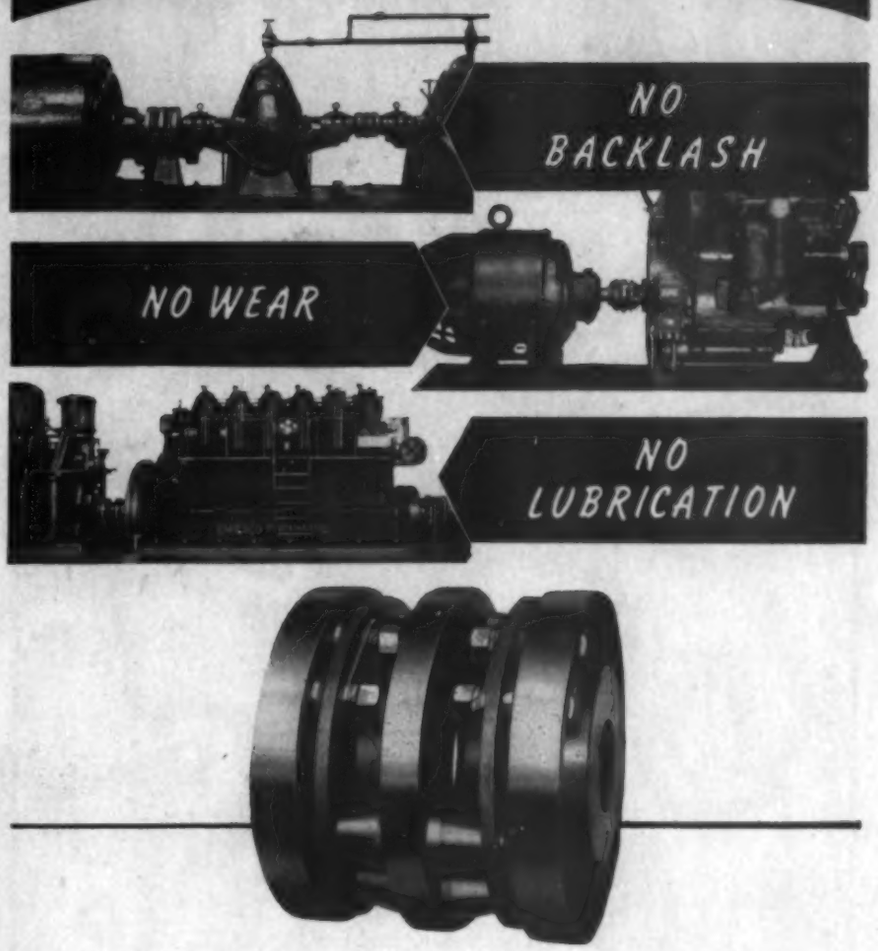

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Pangborn Corporation, in company with the front line of American industry, recently won the Army-Navy "E" pennant for excellence in war production. This citation came because Pangborn ROTOBLAST Barrels, Tables and Special Cabinets—Pangborn AIR BLAST Rooms and Special Machines are removing scale and dirt from hundreds of thousands of castings, forgings, stampings, heat treated and other metal parts daily to help SPEED UP the fire power that is so badly needed NOW.

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ed with stock dust. The current dust being hot and dry had to be wet down anyway to get a mix of proper moisture content for sintering. The same condition holds true today in those operations where flue dust is the major portion of the mix. With such conditions the heat and dryness of the return material had no value and the material usually was wet down to protect the equipment used to deliver it to a bin for feeding into the mix.

But for the modern plant which uses a large percentage of ore the fundamentals of this part of the sintering operation are completely reversed from the old flue dust practice. With the moisture content of natural ores the heat and dryness of the return material are of the utmost importance and during periods of wet weather they are vital.

Values Are Utilized

To utilize the full value of heat and dryness the return material should be introduced into the mix without wetting or cooling. Conveying the raw materials is not difficult. Construction, operation, and maintenance of a belt conveyor are simple and economical. A rubber conveying belt resists abrasion and has long life when conveying cold materials. Conveying return material presents some difficult problems. The material is hot and abrasive.

Heat, as known, makes a rubber belt entirely impractical. Pan or vibrating conveyors are practical but are expensive to install and have operating and maintenance problems due to the heat and abrasive nature of the return material. One solution of this problem would be to have a refractory lined bin, directly under the grid chute, equipped with a gate to permit direct feed into a preliminary pug mill and then bring the cold raw mix to the mill. This construction would permit full recovery of the heat and dryness values of the return material and completely eliminate all of construction, operating, and maintenance problems of conveying the hot abrasive return material.

Preliminary pug mill could be of the simple drum type since its purpose is simply to kill excess moisture in raw material and/or to kill excess heat in the return material as a protection for the rubber conveying belt after the mill. From the preliminiary mill the pugged mix can be conveyed by rubber belt to a secondary pug mill located at the feed end of the sintering machine. Just ahead of the secondary mill there should be a small surge bin to take care of any momentary irregularity in the feed flow.

Secondary pug mill should be a blade mill. Importance of the pugging operation will vary with materials but no material can be overpugged. At this

mill, located just ahead of the sintering machine and close to the hand of the machine operator, the mix should be conditioned for moisture and carbon. Both of these factors are vital to the operation and when adjustment is needed it should be possible to make it where the benefit can be had immediately. Controls for governing the feeding rate of raw materials, fuel, and return material, should be located to the convenience of the machine operator. With such an arrangement a steady flow of feed can be maintained and any necessary change in the proportions of materials can be immediately effected.

(Concluded in next issue)

Savage Tool Offers Films on Gage Blocks

Four new 35-millimeter sound slide films describing the use of gage blocks are being offered for presentation before plant executives, foremen, inspectors, trade school classes, by Savage Tool Co., Minneapolis. These give presentations on: "Theory of Gage Blocks," "How Gage Blocks are Used," "How Gage Blocks are Made" and "The Use of Gage Instruments."

The films, states the company, are designed to remove the "mystery" and misunderstanding prevalent in industry about these modern "jewels of industry." Entire history of how gage blocks came into being is graphically shown by a complete portrayal of the evolution of our modern system of measurement.

The discovery of the constancy and uniformity of light waves, which finally gave man a permanent basis on which to base the formerly arbitrary units of length, is presented in a clear and understandable manner. "How Gage Blocks Are Used," shows the proper care of these gages as well as the manifold uses for them in actual machining operation, as well as the multitude of applications in inspection and checking.

Induction Heating

(Concluded from Page 120)

of induction heating will increase rapidly in the immediate future for all types of heating operations—hardening, annealing, brazing, forging, soldering, and melting. Many changes in our methods of manufacture can be expected because of the speed with which heat can be developed in the work by high-frequency currents. Add to this the uniform and precise results that induction heating offers, and it is obvious that this process will make possible the handling of jobs which can be done in no other way as well as greatly facilitate more conventional operations.

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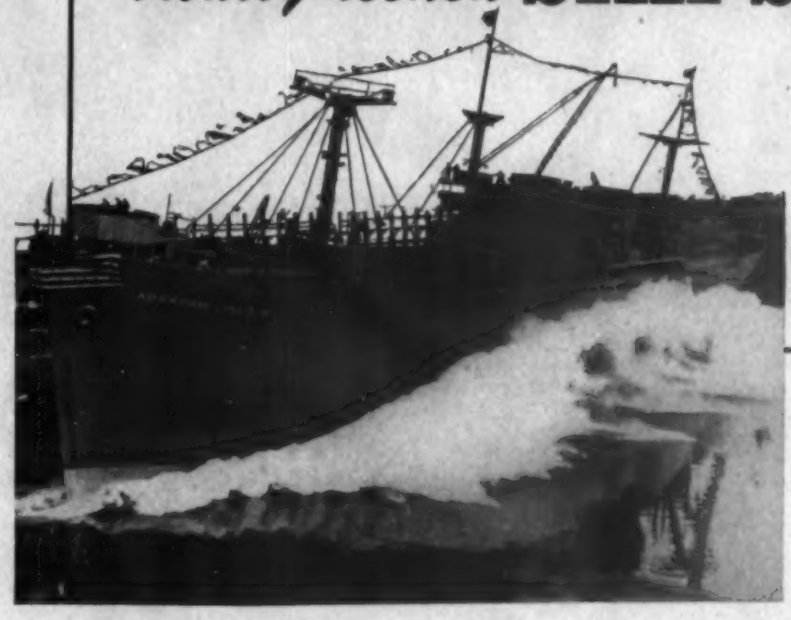

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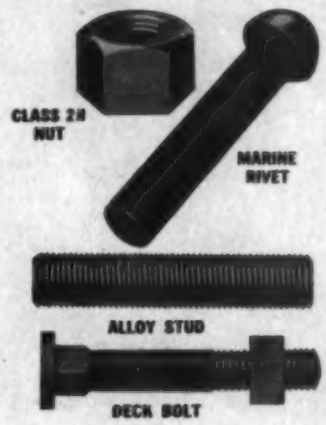

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Shear Type Tools

(*Continued from Page* 124)

shear type tool is mounted in exactly the same position, the vibration is generally reduced to practically zero.

Fig. 1 shows a sketch of a part made of a particularly tough alloy steel casting on which the outside diameter was turned, both ends faced and the flat planed. The first of these operations was performed on a 60-inch vertical boring mill in good condition with the tool mounted in the side head and the ram having an overhang of 19 inches.

It was found that the entire part could be easily machined without regrinding the tool, using a feed of 0.015-inch per revolution, a depth of cut ranging from ¼ to ¾-inch and a cutting speed of 200 feet per minute. The bottom end of this part was faced on the same machine, with the tool mounting in the right hand vertical ram. Speed, feed and depth of cut were approximately the same as for the turning operation.

Vertical Lathe Used

A vertical turret lathe was used for facing the top end of this tough casting. This machine was considerably lighter and speed was reduced in accordance to 158 revolutions per minute.

The last operation, planing the flat, was performed on a planer with tool in a vertical head position. Cutting speed was 50 feet per minute and cutting time was reduced from 8 to 3 hours. Feed in this case was 0.045 to 0.050-inch with a depth of cut of from ¼ to ⅝-inch.

Another type of application in which good results were obtained with a considerably smaller negative back rake is illustrated in Fig. 2. The operation consisted in facing top and bottom of this tough alloy steel casting. Two castings were mounted on a vertical lathe for simultaneous machining. A Carboloy standard T-1410 tool was used with the back rake ground to a 5-degree negative angle. With a cutting speed of 240 feet per minute (at the beginning of the cut) and a depth of cut of roughly ½-inch or better, both castings could be machined on both sides without regrinding the tool. Finish near the inside diameter was not as good as at the beginning of the cut since the speed dropped to 94 revolutions per minute and the negative back rake placed the nose of the tool considerably back of center.

The same part also was turned on the same type machine with the regular "shear" type tool mounted in the side head.

The ram overhanging in this case was 16 inches. With a cutting speed of 197 feet per minute, a feed of 0.015-inch and a depth of cut from ¼ to ¾-inch, several castings could be turned before

the tool required attention or regrinding.

An example of machining an extremely tough-to-machine part on an old machine is illustrated in Fig. 3. The job was to bore the 32-inch inside diameter with an interrupted cut. The machine was a 35-year-old horizontal locomotive cylinder boring machine in extremely bad condition. Gear teeth were shot, while the spindle actually had 1/16-inch of play. The electrical system was in no better condition. The work was clamped to the table, poorly supported using shims and jacks.

Tools Come Through

In short, this was just the assortment of conditions which would make the successful use of a carbide tool seem highly improbable. To meet this set of conditions, the tools were provided with a 60-degree lead angle instead of the usual 15-degree to compensate for the upward lift of the spindle resulting from the bad bearings in the machine.

Two tools were inserted in a 28-inch diameter cat-head mounted on an 8-inch diameter bar with an overhang of 32 and 40 inches. The maximum safe speed was only 10 revolutions per minute for a surface speed of 83 feet per minute. Lowest available feed per tool was 0.021-inch. Depth of cut was roundly %-inch.

With this setup the shear type tools produced two to three complete pieces per tool grind.

All castings mentioned here were not only extremely tough but also scaly and well impregnated with sand pockets and hard spots. In addition, some portions of the castings had glassy hard surfaces as the result of previous flame cutting.

Revised List of Standards Published by ASA

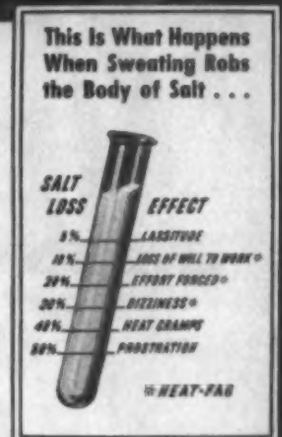
More than 600 standards are embodied in the new list of standards recently published by the American Standards Association, 29 West Thirty-ninth street, New York, for use as reference by engineering and purchasing departments of manufacturing plants. Ninety-four of these represent new and revised standards approved since the last issue.

Standards in the publications are listed by subject and cover civil, mechanical, electrical, mining, chemical and other engineering fields as well as metals and materials, methods of test for the finished product, dimensions etc. They serve as a basis for many municipal, state and federal regulations.

According to ASA, the standards represent in each case general agreement on the part of maker, seller and user groups as to the best current practice. More than 500 national organizations are at present taking part in this work.

Trigger Fingers... Must Not Fail

From the stink holes of the Solomons and the burning sands of Africa to the industrial heart of America, salt tablets play their part in preserving the will to win and the will to work. Whether power tool or rifle, trigger fingers must not fail. Men must stay alert and on the job.



Wherever men sweat, Heat-Fag is a threat. Sweat dissipates body salt. Unless body salt is replaced and the correct balance maintained, Heat-Fag takes its toll. It slows down reactions — renders men inalert — exposes them to industrial accidents.

Production-minded industries insist on Salt Tablets for men who sweat and do hot work. They keep men alert and efficient through long, hard, hot hours.

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(Less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds

Case of 9000, 10-grain Salt Tablets, $2.60
Salt-Dextrose Tablets case of 9000, $3.15

Place MORTON'S DISPENSERS at all Drinking Fountains.
They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.
500 Tablet size - $3.25
1000 Tablet size - $4.00

Order from your distributor or directly from this advertisement . . . Write for free folder.

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BIG BEAM
PORTABLE ELECTRIC RECHARGEABLE
HAND LAMP

• BIG BEAMS HAVE GONE TO WAR . . . on Land, Sea, and Air . . . and they're helping to win it. BIG BEAMS are standardized by some of the largest Defense Plants, Public Utilities, Hospitals, Railroads, and other industries throughout the country. BIG BEAMS guard against sabotage around plants, protect against light failure, high line inspection and repair, and have many other important functions.

Diversified uses have made necessary many special designs which will greatly increase the utility of these fine lamps AFTER THE WAR!

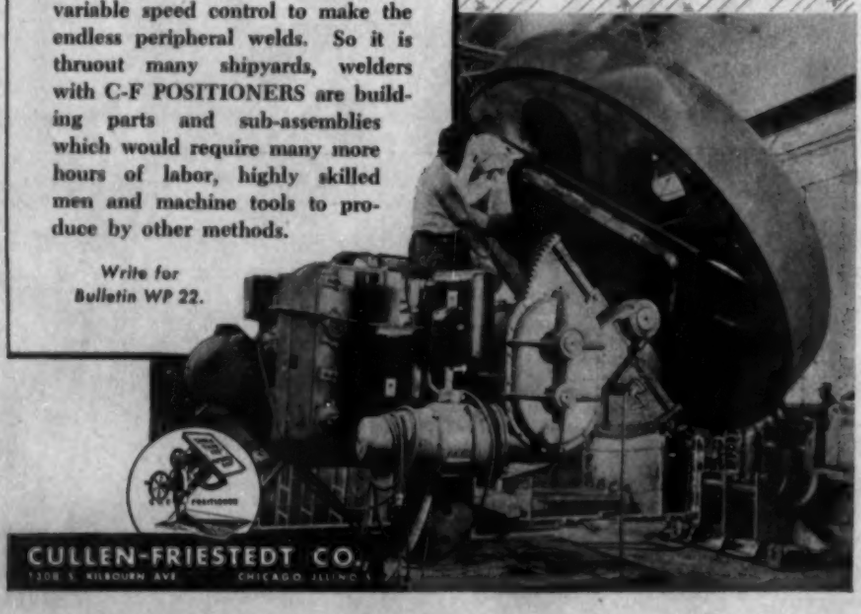
• *Write Sales Department for descriptive literature.*

U. C. LITE MFG. CO. 11 E. HUBBARD ST. CHICAGO, ILLINOIS

• Welding has become a quantity production operation with C-F POSITIONERS because the welders themselves can now position giant weldments without a crane or sling crew. On the giant turbine gear blank shown the welder welds all sides and internal angles downhand — just pushes buttons to tilt the blank up to 135° beyond horizontal or rotate it 360°, under variable speed control to make the endless peripheral welds. So it is thruout many shipyards, welders with C-F POSITIONERS are building parts and sub-assemblies which would require many more hours of labor, highly skilled men and machine tools to produce by other methods.

Write for Bulletin WP 22.

C-F POSITIONERS
help build ships for Victory



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Segment Cutting Method Conserves Steel Plate

A highly efficient method for conserving steel plate stock, simultaneously increasing the number of segments cut from it, was recently suggested by Spencer K. Fredericks, General Electric welder. It involved changing the arc length and rearranging the nesting of the templets of segments cut from large rectangular sections of 1 and 1½-inch steel plate stock.

By reducing the arc lengths of the segments from 90 to 60 degrees, and by arranging the templets crosswise rather than lengthwise on the plate stock before cutting, the amount of scrap left from the operation was greatly reduced. In addition, the nesting arrangement results in sections of uniform shape being so placed that a battery of acetylene torches cuts through them simultaneously, rather than singly, thus conserving man-hours and speeding up production.

These segments are welded together to form large motor frames. On a recent job requiring the cutting of sufficient segments for 72 large motors, the new method effected a saving of 20 per cent in scrap over the former method. The company awarded Spencer $750 for his suggestion.

Report on Tropical Hard Wood in Industry Offered

A wartime report on Lignum-Vitae, a tropical wood said to have a density approximating that of iron, is being offered by Lignum-Vitae Products Corp., 96 Boyd avenue, Jersey City, N. J., to production and engineering executives.

The report describes many diversified and some unknown applications of the wood in connection with the war effort—its uses with mechanical equipment in form of pulleys, roll bearings for steel mills, cylinders, wheels and bushings.

Schools, research labs and others interested in the report are invited to send for it.

Booklet Tells How To Lubricate Wire Rope

To aid in the conservation efforts of industrial America, Keystone Lubricating Co., Philadelphia, recently issued a booklet dealing with the lubrication of wire cable. It likens the wire cable to a group of bearings working against each other, in pointing out to the reader the reasons for lubrication.

According to the publication, friction is the greatest enemy of the wire rope, and means must be taken to prevent chafing, scraping and destructive action as the individual wires of the wire rope work against each other.

Helpful Literature

1. Aircraft Tubing

Ohio Seamless Tube Co.—7-page booklet, "Steel Tubing for Aircraft Use," offers purchasing data, specifications, information and definitions to facilitate the ordering of welded and seamless tubing for aircraft applications. Material is presented in outline form for easy reference.

2. Safety Equipment Care

Mine Safety Appliances Co.—32-page illustrated handbook lists "Do's and Don'ts" of safety equipment care for key personnel in form adaptable for instruction of equipment users. Covers every type of personal protective equipment. Includes section on methods of sterilization of masks and respirators.

3. Furnaces

Lindberg Engineering Co.—8-page illustrated bulletin No. 140 discusses applications of line of furnaces for heat treatment of aluminum, magnesium and their alloys. Zone control method of heating large loads is explained. Wide range of sizes available in both vertical and box type furnaces are shown. Line drawings point out construction features.

4. Temperature Cabinets

Precision Scientific Co.—48-page illustrated catalog No. 325 is descriptive of "Precision-Freas" constant temperature control cabinets. Included are variety of standard models as well as constant temperature cabinets and baths built to specifications. Catalog also contains general information pertaining to mechanical and gravity convection heat transfer.

5. Adhesives

Paisley Products, Inc.—4-page illustrated folder on labeling and packaging adhesives covers materials for labeling, wrapping, sealing and other packaging operations in all types of industries.

6. Refractories

Laclede-Christy Clay Products Co.—6-page chart gives engineering information and uses of complete line of refractories and refractory specialties. Products included are high temperature cements, coatings, plastics, fire brick and insulating fire brick. Chart is particularly useful in helping to determine what refractory is right one for specific job.

7. Thread Miller

Flan-O-Mill Corp.—14-page illustrated bulletin is on No. 3 "Flan-O-Mill" form and thread milling machine which features complete feed control. This production machine is designed for milling internal and external, right and left hand threads and forms ranging in size from ½ to 8 inches inside and outside diameter.

8. Variable Speed Drive

Link-Belt Co.—56-page illustrated bulletin No. 1874 describes "P.I.V." positive infinitely variable speed changer. This fully enclosed, self-lubricating chain drive speed selector is available in 7 sizes and in 5 standard types for horizontal and vertical mountings. Either mechanical or electrical controls may be used on all types. Bulletin shows sizes, types, capacities, speeds, operating principles and typical applications.

9. Rectifiers

Hanson-Van Winkle-Munning Co.—12-page illustrated bulletin No. ER-103 describes line of copper oxide rectifiers for electroplating, anodizing and electrotyping. Units are made in sizes ranging from 300 to 2000 amperes at 6 volts and from 150 to 1000 amperes at 12 volts. Construction, operation and applications of these units are discussed.

10. Brass & Bronze Castings

Hammond Brass Works—20-page illustrated bulletin, "Practical Data on Brass and Bronze Castings" explains nomenclature of copper alloys; gives compositions and properties of copper, manganese and aluminum bronzes, and lists standard specifications. Physical constants of metals and metallurgical elements are tabulated.

11. Marking Crayons

Helmer-Staley, Inc.—8-page illustrated folder, "Write With Real Paint," is descriptive of line of "Paintcil" marking sticks which are available in types for permanently or temporarily marking on hot surfaces of metals and for marking on all hard surfaces. Sticks are furnished in several colors.

12. Cut-off Wheels

Norton Co.—28-page illustrated booklet describes abrasive cut-off wheels. Aluminum oxide is used for cutting steel and most other metals; silicon carbide for cutting non-metallic materials such as carbon, tile, slate, ceramics and insulating board. Chart lists general recommendations for selecting wheels for cutting various materials.

13. Brazing Alloys

Handy & Harman—20-page illustrated bulletin No. 12-A explains application and procedure for low temperature brazing of metals with "Sil-Fos" and "Easy-Flo" alloys. First is low temperature copper-phosphorus-silver alloy which melts at 1185 degrees Fahr. and is intended for use only on nonferrous materials. Second melts at 1160 degrees Fahr. and may be used on all ferrous and nonferrous metals.

14. Rotary Gear Finishers

Michigan Tool Co.—4-page illustrated bulletin No. 862 is descriptive of "Michigan 862" rotary crossed-axis gear finishers for shaving gears up to 2 feet in diameter, such as those used in speed reducers and turbines. Provision is made to permit crowning of gears when desired.

15. Recirculating Fans

Mahr Manufacturing Co.—4-page illustrated bulletin No. 1070 covers temperature fans built specifically for recirculation of heated gases. Fans can be re-assembled at any time in any of sixteen accepted, standard discharge positions without cutting, welding and rebuilding of housing.

16. Carbide Tools & Blanks

McKenna Metals Co.—40-page illustrated catalog No. 43B contains revised prices of "Kennametal" standard, non-standard and special tools and blanks. Diagrams show clearance and rake angles, sizes of tips, shank dimensions and proper use of tools.

17. Spring Design

Mid-West Spring Manufacturing Co.—40-page illustrated manual, "Spring Design and Engineering," contains formulas of spring design and engineering for compression, extension, torsion, flat spiral or motor, flat springs and wire forms. Data sheets are included for making sketches of spring requirements.

18. Bolt Cutters

H. K. Porter, Inc.—48-page illustrated handbook on "Porter Cutters" presents data on application, selection, use and care of bolt, chain, rod and other lever action hand cutting tools. Detailed directions are given also on correct use of cold chisels, files, ball pein hammers, hack saw blades, taps and high speed tool bits.

19. Precision Gages

Perfex Gage & Tool Co.—4-page illustrated bulletin, "Rigid Inspection for Greater Perfection," explains methods used to inspect gages under exact temperature control. Typical gages shown include thread length, flush pin, thread, contour snap, arbor concentricity, adjustable snap and contour types.

20. Milling Machine

Pratt & Whitney division Niles-Bement Pond Co.—8-page illustrated circular No. 470 gives full specifications of No. 8 model C universal bench miller which is designed for toolroom or production line applications. This precision machine tool is adaptable to wide range of operations through relatively simple setups.

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21. Corrosion Data

International Nickel Co.—4-page "Corrosion Data Work Sheet" is designed to assist executives and engineers in their study of corrosion problems. Sheet acts as check list to insure consideration and evaluation of all factors influencing corrosive action. Company's Technical Service invites plant men to submit completed Work Sheets for interpreted data from its files.

22. Gas Furnaces

Johnson Gas Appliance Co.—8-page illustrated broadside, "Two Weeks' Delivery," is descriptive of bench and pedestal type heat treating furnaces, pot-hardening furnaces and heavy duty gas-fired furnaces which are available in wide range of sizes and capacities for various industrial applications.

23. Combustion Control

North American Manufacturing Co.—2-page illustrated bulletin No. 18-O concerns "Ratio-trol," a single valve operated device which furnishes exact amount of oil necessary to maintain same combustion conditions for any given flow of air in oil burner. Since only pressures are controlled, one or many burners may be operated from same control. Illustrations show operation.

24. Industrial Shades

Hough Shade Corp.—Illustrated bulletin No. 151 shows how "Ra-Tox" offset wood slat shades for industrial sash are being used in large plant to control light from windows without glare or draft. Shades are readily installed and protect workers from sun heat.

25. Material Handling Tongs

Heppenstall Co.—20-page illustrated bulletin, "Heppenstall Automatic Safe-T-Tongs," covers design and capacity of various types of tongs for ferrous material handling, as well as devices for handling coil reels, ingots, paper bales and similar materials. Actual applications of these units in all types of operations are shown.

26. Precision Products

Hardinge Brothers, Inc.—16-page illustrated "General" bulletin is descriptive of precision lathes, second operation machines, milling machines, collets, feed fingers, circular form and cut-off tools, speed chucks and collet index fixtures. All of these machines and accessories are designed for precision machining applications.

27. Diaphragm Valves

Hills-McCanna Co.—20-page illustrated catalog No. V-41 gives details of design and applications of "Saunders" diaphragm valves which are made for effective control of acids, alkalies, gases, semi-solids volatile and viscous substances, hot and cold water, and compressed air. Various constructions are engineered for specific types of service conditions.

28. Tool Maintenance

Independent Pneumatic Tool Co.—20-page illustrated booklet No. JE-199 tells how to obtain maximum service from portable electric tools. Complete instructions are given on proper care and operation, with right and wrong methods clearly illustrated.

29. Fire Fighting

Walter Kidde & Co.—16-page illustrated bulletin, "How to Teach Fire Fighting," gives detailed instructions for staging demonstrations before factory personnel on correct fire fighting procedure. Types of industrial fires, soda-acid extinguishers, water extinguishers, dry compound extinguishers, foam extinguishers, vaporizing liquid and carbon dioxide types are described.

30. Portable Search Lights

U. C. Lite Manufacturing Co.—Three 2-page illustrated data sheets are descriptive of No. 411, No. 700 and No. 1000 portable, storage battery-operated and dry cell type searchlights which are adaptable for emergency lighting service.

31. Machine Drives

W. A. Jones Foundry & Machine Co.—20-page illustrated bulletin No. 80 describes herringbone reducers, worm gear speed reducers, worm-helical speed reducers for vertical shaft drives, spur gear reducers and gears. Also covered are car pullers for spotting railroad cars, door hoists for handling furnace doors, skip hoists and wide range of power transmission equipment.

32. Press Welders

Progressive Welder Co.—4-page illustrated bulletin No. 601 describes and gives full specifications of line of standard press welders which are made in ratings ranging from 30 to 600 kilovolt-amperes. These machines are designed for use wherever assembly by projection welding is feasible. All models are fitted with double cooling water manifolds.

33. Black Oxide Finishes

Oakite Products, Inc.—20-page illustrated booklet No. 5769 is entitled, "Surface Preparation of Metals With Oakite Materials and Methods Before Black Oxide Finishing." Degreasing, descaling and derusting methods being successfully used for prefinish surface treatment are covered. Data are included on reclaiming of black finished parts that have failed to pass inspection.

34. Milling Machines

Industrial Tool & Die Works, Inc.—12-page illustrated bulletin gives complete specifications and describes features of No. O-9 vertical milling machine which is combination vertical miller and jig borer. Spindle speeds range from 325 to 3500 revolutions per minute and overall table working surface is 24 x 6 inches.

35. Metal Cleaning

Magnus Chemical Co., Inc.—72-page illustrated booklet is technical manual on materials, methods and machines for war time metal cleaning. Machines illustrated are of special design to meet conditions imposed by specific cleaning problems. Among subjects discussed are alkaline cleaners, solvent cleaners, petroleum spirit cleaning and emulsifiable cleaners.

36. Manufacturing Facilities

Lombard Governor Corp.—64-page illustrated booklet is entitled "A Report To The Nation." It shows company's plant, many products and methods of machining. First section is devoted to history of plant; middle section to methods of manufacturing, personnel and some of products; last section to prospects of the future.

37. Fluorescent Fixtures

Mitchell Manufacturing Co.—8-page illustrated catalog No. 400 introduces "Mitchelite" line of fluorescent fixtures for factory, office or drafting room use. Fixtures meet requirements of WPB and U. S. Bureau of Standards. Models can be used for both individual and continuous row lighting, for surface or suspension mounting. Prices are listed.

38. Retaining Rings

National Lock Washer Co.—6-page illustrated folder describes retaining rings made of spring steel which are heat treated after forming. Rings are made in closed and open types in round or in square sections. Charts list standard stock sizes but special sizes and cross sections can be made at small extra cost to meet individual requirements.

39. Milling Machine

Ohio Machine Tool Co.—8-page illustrated bulletin No. 400 is descriptive of the "Ohio Miller" which is capable of milling with and against feed. Climb-cutting produces longer life and ability to mill both ways makes possible continuous milling with fixtures secured rigidly to table without index tables. Line drawings show construction.

40. Industrial Lighting

Holophane Co.—16-page illustrated bulletin, "Controlled Lighting," deals with design, selection and application of industrial lighting systems in all types of plants. Concentrating distribution, intensive distribution, extensive distribution and widespread distribution are explained. Typical lighting fixtures which are designed for industrial use are briefly described.

41. Metal Band Saw

Johnson Manufacturing Corp.—4-page illustrated bulletin describes "Johnson" metal cut-off band saw which has capacity up to 10 x 18-inch stock. Machine may be used to cut rods, tubes, angles, heavy rounds and irregular shapes. Accurate cuts are possible with minimum of set-up requirements. Feed is automatic.

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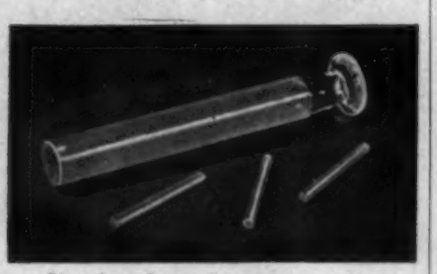
A SHOT IN THE ARM MAY SAVE A SOLDIER'S LIFE

Precious blood plasma for the wounded, serums for the sick, narcotics to deaden pain—yes, hypodermic injections are vital life-savers on every battle front!

Today, the plungers for these hypodermic injectors are made of glass, centerless ground within a tolerance of .0005" for roundness and dimension. The accuracy and finish of the centerless grinding is of



Lives depend upon the accurate grinding of these little pieces of glass.

the utmost importance. Any pitting or irregularity may permit air bubbles to get into the fluid and, in turn, be pumped into the blood stream with fatal results.

Accurately ground glass plays another important part in the war effort, too. Glass "go, no-go" plug-type gauges ground within a tolerance of .0001" are helping manufacturers of vital precision parts for planes, tanks, guns and ships do a faster, better job.

Precision grinding of every type with amazing accuracy, ON A MASS PRODUCTION BASIS!—that's ACE's vital contribution to winning this war. Here is a great American plant with precision tools, centralized responsibility and sleepless ingenuity. Here is where to come for practically every operation in the manufacture of small parts where accuracy is required, both now and after the war.

Inspection of each individual piece!

ACE

ACE MANUFACTURING CORPORATION

for Precision Parts

1249 E. ERIE AVENUE, PHILADELPHIA

Disabled Veterans Look To Industry for Future

(*Continued from Page 86*)

When dismissed from the hospital, the disabled trainee was turned over to the Vocational Rehabilitation Division of the Bureau of Vocational Training and Placement. Training afforded them often was incomplete. Rehabilitation specialists declare that this same mistake can be avoided this time by the thorough methods developed since 1918.

Industry is being depended upon to provide the practical means for applying the principles and policies developed over the past 25 years. In meeting this obligation employers confront the necessity for developing within their own organizations plans which will best work out under the conditions peculiar to their operations. The task will not be an easy one.

Batt Says Huge Output Forces Plant Closings

(*Continued from Page 69*)

them before they were released.

"In the second place, the type of tank they were building was no longer needed in quantity by the armed forces. And this plant was not rated as one of the most efficient tank producers. Then, too, and this is an important factor, some of its tools and welding equipment were needed in speeding up production of more urgent war material."

Mr. Batt said a WPB engineer was already surveying the plant and remaining equipment with a view to putting it to work on other war production.

Warehouses Authorized to Stock Aluminum Rivets

War Production Board has arranged to have stocks of aluminum rivets carried in the following warehouses: Whitehead Metal Products Co. of New York Inc., New York; Steel Sales Corp., Chicago; Metal Goods Corp., St. Louis; J. M. Tull Metal & Supply Co., Atlanta; and Pacific Metals Co. Ltd., San Francisco.

Northwest War Plant Receives Kaiser Iron

A 50-ton carload of pig iron was unloaded at the Western Foundry Co., Portland, Oreg., recently—the first shipment received by a Pacific Northwest war plant from the Fontana, Calif., stack of Kaiser Co. Inc.

The iron will be used in marine engines for Liberty ships completed at Kaiser's Oregon Shipbuilding Corp.

BAD NEWS

for dead pans and sour pusses who complain that American industrial facilities are inadequate to handle rush war orders

WE HAVE EXPANDED THREE TIMES

to take better care of

GALVANIZED PRODUCTS

AND

PRODUCTION HEAT TREATING

Manufacturers of
TENT POLE HARDWARE
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TANK TRACK GROUSSER
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When you place your order with us, you'll notice

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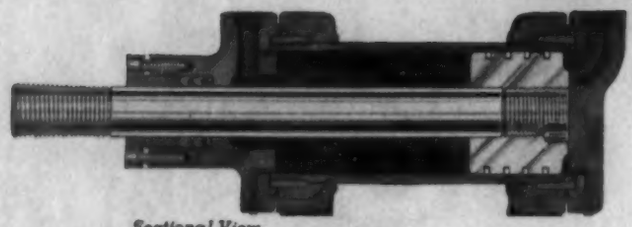
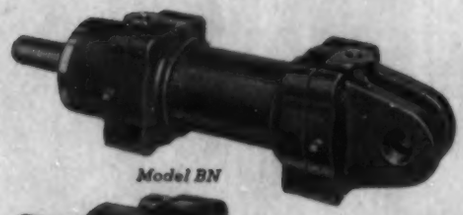
Better Hydraulic Power . . .



Sectional View



Model BN

Model EN
Other Mountings Available

● Hannifin patented high pressure hydraulic cylinders provide stronger, simpler construction, easier application, and high efficiency use of hydraulic power. Mirror finish honing produces a cylinder bore that is straight, round, perfectly finished for efficient piston seal with minimum fluid slip. No-tie-rod design and universal end caps which may be positioned independently provide for simplest installation and convenient piping.

Built in seven standard mounting types, with small piston rod, 2 to 1 differential piston rod, or double end rod, in all sizes. Furnished with or without cushion. Many special types available, any size, for any pressure. Write for Bulletin 35-S.

HANNIFIN MANUFACTURING COMPANY
621-631 S. Kolmar Avenue, Chicago, Illinois

HANNIFIN HYDRAULIC CYLINDERS

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We're sorry that we can't tell you the whole story . . . of all the things Bissett engineers are doing for Bissett customers these days . . . but needless to say, you can still get service from our warehouse. Why not try us?

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Tells Enamelers They Face Keen Competition

ENCROACHMENT in the postwar period of light metals, plastics, plywoods and other products upon established markets for enameled metals may mean some loss of business for producers in that industry, but closer control of operating costs and industry-wide concentration on methods to reduce them should vastly improve their competitive position.

This view of the future for enameled metals was presented by L. S. Hamaker, assistant general manager of sales, Republic Steel Corp., in his address before the Porcelain Enamel Institute at its twelfth annual meeting in Cleveland June 8.

Mr. Hamaker said economics will govern the application of these products after the war as was true in the past; that any loss of business in the past has not been due to the superior merits of substitute products but because the cost of enamel has been too high.

New market developments, important as they are, will not make obsolete everything that has been done before the war, he stated. Technical changes must be absorbed and digested. The consumer will not wait for the last word in technical development to satisfy a long-postponed want. As a result, most companies will resume production of the models for which they have the dies and tools. Changes will not come until the need for sales stimulation becomes evident.

Several Factors Improve Outlook

Among factors improving the outlook for the industry, Mr. Hamaker listed the redistribution of wealth and income that will enable millions to satisfy long-established needs for the first time; the anticipated postwar housing boom which is estimated at one million new dwellings per year for perhaps ten years; large increase in the number of future family units to result from the much higher birth rate and millions of postwar marriages; great reservoir of consumers' cash savings and regional shifts in population tending to aggravate the shortage of consumers' goods of all kinds in the areas of concentration, many of them new war production centers.

Discussing "Building Codes as They Affect the Porcelain Enamel Industry," B. L. Wood, consulting engineer, American Iron and Steel Institute, pointed out that the most cleverly conceived promotional campaign for broader participa-

tion of architectural porcelain enamel in the postwar construction market may prove to be ineffective if building ordinances of cities prevent use of the product or if improper installation of the product in conspicuous places results in an unsightly appearance.

Mr. Wood described the work of the Institute's Committee on Building Codes toward revision of regulations on a basis consistent with relative fire safety afforded by different types of construction.

All officers of the Porcelain Enamel Institute were re-elected: P. B. McBride, Porcelain Metals Corp., Louisville, Ky., president; R. H. Turk, Porcelain Enamel & Mfg. Co., Baltimore, vice president; R. R. Danielson, Metal & Thermit Corp., Carteret, N. J., vice president; William Hogeuson, Chicago Vitreous Enamel Products Co., Cicero, Ill., treasurer, and C. S. Pearce, Washington, managing director.

Metal Institute Seeks To Speed Production

The Pressed Metal Institute, organized last March by representatives of sheet and strip metal fabricators, rolling mills and metal press manufacturers, will cooperate closely with the various government agencies in speeding up and increasing mass production of war materials, George E. Whitlock, president, states in an announcement outlining the objectives of the organization.

In addition the group will press research in an effort to develop new and extended uses for metal stampings.

Administrative offices of the organization are at 19 West 44th street, New York city, but in addition the institute has opened an office in the Press building, 14th and F streets, N.W., Washington.

In addition to Mr. Whitlock, officers are: S. J. Menzel, Detroit, vice president; H. L. Moody, New York, secretary-treasurer, and managing director. The board of trustees consists of the following: Frank E. Graper, Toledo, O.; W. W. Galbreath, Alliance, O.; J. H. Robins, Philadelphia; G. F. Ahlbrandt, Middletown, O.; William H. Miller, Utica, N. Y.; W. E. Porter, East Boston, Mass.; R. W. Glasner, Chicago; G. H. Roberts, Detroit; William J. Meinal, Philadelphia; W. C. DeMaris, Philadelphia; Roy C. Ingersoll, Chicago; Stephen J. Menzel, Detroit; George E. Whitlock, Salem, O.; I. R. Morris, Cleveland; K. T. Norris, Los Angeles.

Miscellaneous construction projects having total estimated cost of $4,160,085 were halted during the period of May 24 through May 28.

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Acceleration of materials handling tempo puts the spotlight on *safety*. Krane Kar's ease of operation, stability, unobstructed vision, full traction, and other safety features provide maximum manpower protection 168 hours a week. Send for literature.

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The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

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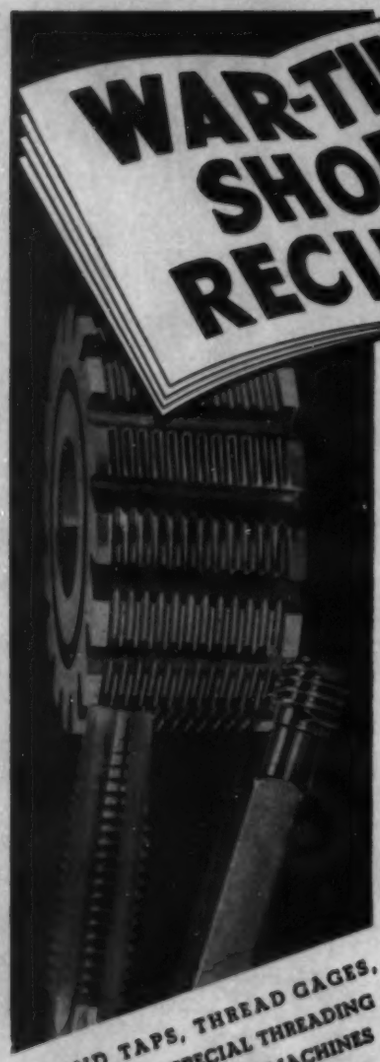

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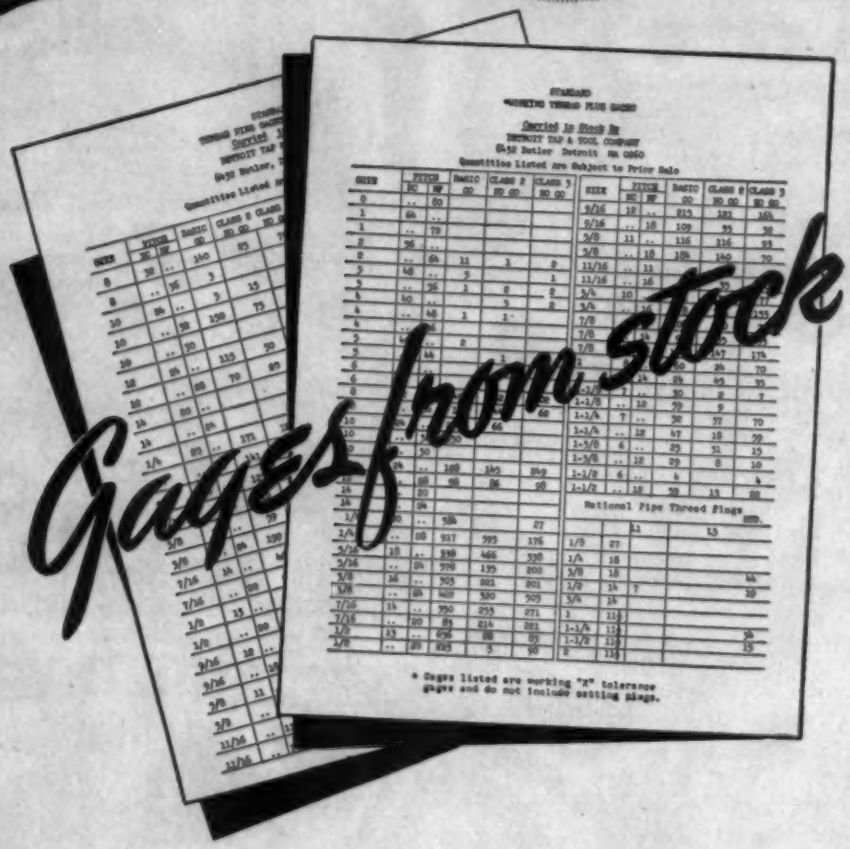

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HOUSTON	CApitol 5634	TOLEDO	GArfield 8017
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LOS ANGELES	KImball 9111	MONTREAL	MArquette 5346
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More Semifinished Moving On Lend-Lease Account

Export shipments increasing as ocean safety grows . . . Mills booked for most of last half . . . Tin plate orders heavier, production at 65 per cent . . . Railroad needs pressing

DEMAND
War needs take entire output.

PRODUCTION
Down 2 points to 96½ per cent.

PRICES
Steady at ceilings.

AN IMPORTANT factor in the tightening situation in steel delivery may be found in increased shipment of semifinished material abroad.

Present indications are third quarter movement will be the heaviest in more than a year, in sharp contrast with last fall when tonnage accumulated at ports was offered for sale and orders on mill books were canceled. Since then the quantity moved under lend-lease has been small, until late February when it started to increase. This resurgence of exports reflects the easier shipping situation as more vessels are clearing American ports and arriving safely. A recent decrease in ocean insurance rates by Lloyds is an earnest of the better shipping situation.

Deliveries on current steel orders are receding steadily in spite of practically capacity production. Plates, under close supervision by War Production Board, are being supplied to shipyards, the largest consumers, strictly on schedule and stocks are kept close to needs, inventory being held to tonnages that will prevent delays. Occasionally some sheared plates are delinquent at the month-end but this is corrected with little delay. Bars are available on steadily receding deliveries, although small sizes can be placed in small lots for July shipment, with August available on medium sizes. Many mills are booked almost solidly for third quarter on small and medium and practically all are out of the market on large sizes for third quarter, some having nothing before November.

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Sheetmakers in general are covered for third quarter delivery on both hot and cold-rolled material, except galvanized, and in some cases are booking considerable tonnage for fourth quarter. Mill quotas have restricted cold-rolled capacity to an extent that producers are as tightly booked as for hot-rolled. Midwestern sheet distributors have been granted a price increase on galvanized secondary grades.

Steel ingot and castings production in May was third largest for any month in the history of the industry, at 7,545,379 net tons, an increase over April but short of the all-time record in March. A feature of May production was the third consecutive high mark in electric furnace ingots, which were produced at 102.9 per cent of rated capacity.

Scrap supply is sufficient for current needs and deliveries in the Midwest have returned to normal after recent floods subsided. In general melters are able to lay down some reserves but backlogs have not been accumulated to the usual degree. Banking of blast furnaces in the Pittsburgh district as a result of the coal mining interruption is causing use of more scrap in steelmaking and may cut into accumulations laid aside for the winter. Quality has improved in recent weeks as heavier material is coming out better.

Steelworks operations last week dropped 2 points to 96½ per cent of capacity, lowest since March, 1942. Pittsburgh was hardest hit, dropping 8½ points to 90 per cent. Wheeling lost 8 points to 86 per cent, Cleveland ½-point to 95, Cincinnati 6 points to 88 and Birmingham 5 points to 95. St. Louis gained 1½ points to 93 per cent and Detroit 3 points to 83. Rates were unchanged at Chicago, 97 per cent; New England, 95; Youngstown, 97; eastern Pennsylvania, 95; Buffalo, 90½.

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Indications are that new freight car production this year will fall far short of needs as only about 1500 of the 20,000 units planned for first half have been delivered and the remainder probably will not be available before the end of third quarter. It does not seem likely steel will be released for building anything like the 40,000 additional cars asked by the carriers. Steel rail production, estimated at 2,000,000 tons at the beginning of the year, has been reduced considerably, to about 1,200,000 tons, and further cuts may be made.

Relief for the agricultural implement industry is afforded by allocation of 300,000 tons of carbon steel for third quarter and 200,000 tons each quarter from Oct. 1 to July 1.

Tin plate demand is increasing and producers expect third quarter operations will be at the limit of their quotas. While some tonnage is required for ordnance most current output is for canmaking, one large producer estimating that for third quarter 97 per cent of his production will be for that purpose. Labor shortage is being encountered as many workers left for other employment during the slack period. Production now is at about 65 per cent of capacity.

Average composite prices of steel and iron products are unchanged at the levels of the past several months. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	June 12	June 5	May 29	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	June 12, 1943	April, 1943	Feb., 1943	May, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.15	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	June 12, 1943	April, 1943	Feb., 1943	May, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2 fdry., del. Phila. (differ. av.)	25.89	25.89	25.89	25.89
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.34	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.65	140.65	140.65

Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.

(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $30 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c. Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.

Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Gulf ports, 2.47c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products. Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.35
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel			Butt Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

	Lap Weld Steel			Lap Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.99	21.42	17.54	29.00	
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base. per lb.
18.00	4	1	..	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	65½ off
Do., ¼ and ⅜ x 6-in. and shorter	63½ off
Do., ½ to 1 x 6-in. and shorter	61 off
1¼ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
1-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
Wise county, furnace	6.75- 7.25

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic*	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.60	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del.	25.46	24.58	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‖Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. ‖For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese over 1.00%.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.34

(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.33; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-43%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight ton lots 15.00c, less-ton lots 15.25c, allowed; 1% iron; carlots 14.50c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1¼% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; less 200-lb. lots 6.80c. Spot prices ton lots 6.30c; less-ton lots 6.55c; ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., 57 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	7.762[23]	6.062[23]
New York	3.853[1]	3.756[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[11]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[11]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[13]	4.872[25]	4.072[21]	4.772	7.566[23]	5.866[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[13]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	....	3.45[1]	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[13]	4.30[13]	3.75[21]	3.52	7.35[23]	5.65[23]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[13]	4.20[13]	3.65[21]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.00[13]	3.65[21]	....	7.45[23]	5.75[23]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[13]	3.65[21]	....	....	....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[13]	3.75[21]	3.20	7.55[23]	5.85[23]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[13]	3.65[21]	....	....	....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.64[13]	4.30[13]	3.80[21]	3.40	7.67[23]	5.97[23]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[13]	4.77[24]	4.42[21]	....	....	....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[13]	4.77[24]	4.42[21]	....	....	....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[13]	4.37[24]	4.00[21]	3.45	7.60[23]	5.90[23]
Youngstown, O.*	....	....	....	....	....	....	....	4.40[13]	....	....	....	....	....
Middletown, O.*	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[13]	4.10[13]	3.75[21]	3.50	7.35[23]	5.65[23]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[13]	4.00[13]	3.65[21]	....	....	....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[13]	4.23[13]	3.88[21]	3.54	7.33[23]	5.88[23]
St. Paul	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.50[1]	3.85[1]	3.85[1]	5.00[1]	4.35[1]	4.34[21]	3.86	7.70[23]	6.00[23]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[13]	4.24[24]	4.02[21]	3.61	7.72[23]	6.02[23]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[13]	4.25[24]	3.97[21]	....	....	....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[13]	4.00[24]	3.97[21]	....	....	....
Memphis, Tenn.	3.90[8]	3.95[8]	3.95[8]	5.71[8]	3.85[8]	4.10[8]	4.10[8]	5.25[11]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[8]	3.55[8]	3.55[8]	5.83[8]	3.45[8]	3.70[8]	3.70[8]	4.75[19]	4.70[24]	4.43[21]	....	....	....
Birmingham (country)	3.40[8]	3.45[8]	3.45[8]	5.83[8]	3.35[8]	3.60[8]	3.60[8]	4.75[19]	4.70[24]	4.43[21]	....	....	....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[26]	4.95[19]	4.60[21]	5.00	....	....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[26]	4.95[19]	4.60[21]	....	....	....
Houston, Tex.	3.75[4]	4.25[8]	4.25[8]	5.50[8]	3.75[8]	4.50[8]	4.30[8]	5.25[26]	5.43[19]	4.50[22]	....	....	....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[19]	7.15[4]	5.70[22]	....	9.55[23]	8.35[23]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[19]	7.55[19]	5.55[19]	....	9.80[3]	8.80[3]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[19]	7.45[19]	5.45[22]	....	....	....
Tacoma	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.25[8]	5.45[8]	5.70[8]	6.63[24]	5.75[22]	....	....	....
Seattle (city)	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.35[8]	5.45[8]	5.70[8]	6.63[24]	5.75[22]	....	....	8.00[3]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 500 pounds and over, base.

Ores

Lake Superior Iron Ore
Gross ton, 51½%
Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80

less $7 freight allowance

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	100.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Billets per G T	Electric furnace Bars per 100 lb.	Billets per G T
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	.....	.....
NE 9415	.15-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati includes Newport, Ky. St. Louis basing point includes Granite City, East St. Louis and Madison, Ill. San Francisco includes South San Francisco, Niles and Oakland, Calif. Chicago includes Gary, Ind. Claymont, Del., includes Chester, Pa.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah, Arkansas, Nebraska, Kansas. Delivered price may exceed by not more than $7 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $7 the nearest basing point price. Colorado is remote for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92.95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62¼c; Grade D, 99.0-99.74% incl. 51.12½c; Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.ob. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 154

While gaps in sheet schedules have been opened recently, as a result of revisions in ordnance programs, particularly the landing mat program, they have been filled speedily and most sellers now are not only out of the market for third quarter on hot-rolled, but cold-rolled sheets as well. Demand for cold-rolled has not been nearly as active all along, as for hot-rolled material, but mill quotas have restricted cold-rolled capacity to such an extent that some producers now are in little better position in this grade than they are in hot-rolled.

Some producers are booking heavily for fourth quarter delivery while some capacity still is open for third quarter in galvanized and specialty grades. Some steelmakers find application of CMP has brought a better balance and facilitated smooth rolling schedules.

Bars . . .

Bar Prices, Page 154

While bar deliveries generally are tightening, some producers still are able to make good deliveries on small rounds, sizes running up to ⅝-inch. One large producer can actually work in a little for shipment early in July, and certain others have some capacity available in these small sizes late in July and early in August. On medium size rounds, however, August now appears to be the earliest and no large amount is available even then. Some producers are booked up rather solidly through the entire quarter on all sizes, although cut-backs in certain lines may open gaps as the period advances. All producers are out of the market for third quarter on large rounds and squares. Some, in fact, have nothing to offer before late November.

Cold drawers are virtually booked up for third quarter, as orders for cold-rolled carbon bars taken now would be for rolling by the hot mills in September, which would leave little time for cold drawing and shipment before October. As for alloy cold-drawn bars, deliveries range about a month beyond. The aircraft and maritime industries are the largest consumers of cold drawn bars in the East. Machine tool requirements have eased somewhat and there is a much lighter volume of shell inquiry. In fact, some shell cancellations continue, although the gaps have been quickly filled by requirements from other directions.

The ratio between open-hearth and bessemer is narrowing somewhat. At one time, well prior to the war, about as much bessemer steel was used by cold drawers as open-hearth steel. This ratio became increasingly out of balance as the war approached and less than a year ago had reached the point where only about 15 per cent of the steel used was bessemer. This was attributed in no important measure to the character of government specifications.

More recently, however, Washington has made an effort to stimulate the use of bessemer, so as more fully to utilize available capacity. Early in the year, for instance, warehouses were given larger quotas of cold-drawn bars, with the increase to be made up of bessemer. The War Production Board also urged easing in specifications of government procurement agencies, with some success, although not as much as desired. According to some trade interests, cold drawers are now using about 25 per cent bessemer and 75 per cent open-hearth steel.

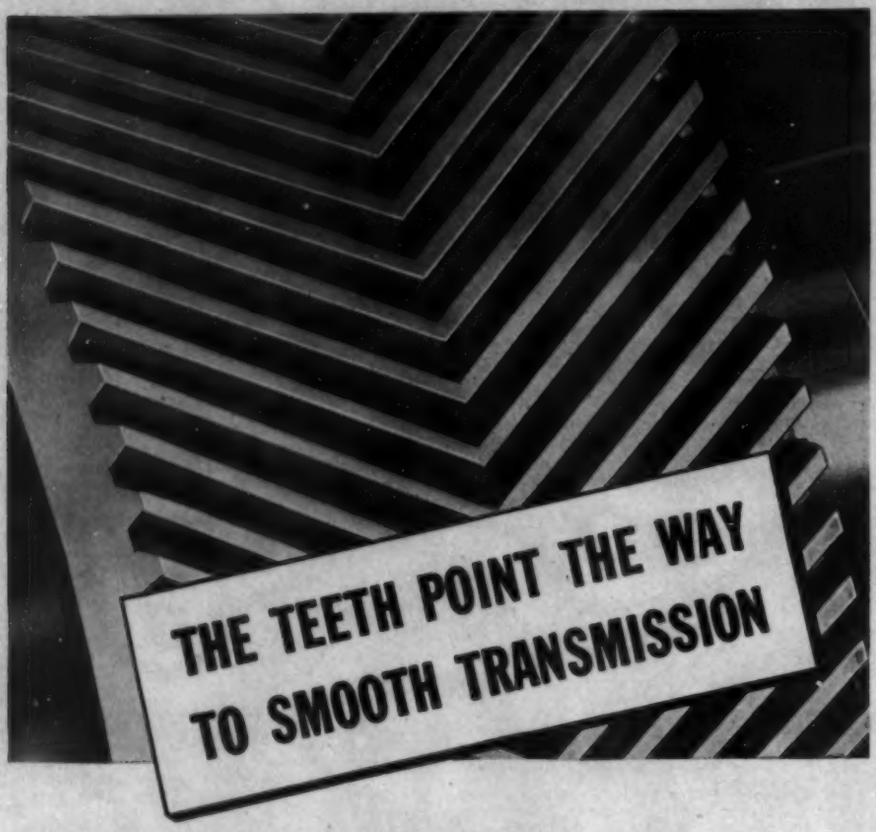
Plates . . .

Plate Prices, Page 155

Plate deliveries to several shipyards in the East are slightly heavier to bring inventories up to better balance. A few yards have been operating on somewhat closer margins of supplies, but on the whole shipbuilders have ample workable reserve stocks. Delinquent tonnage each month is mostly on sheared material and is not serious, slight lags usually being taken up with only minor delay.

Outside of shipbuilding there is some shift in demand. Requirements for steel boilers are declining steadily; new orders thus far this year are less than half those for the corresponding period, 1942, while the decline in square feet of heating space has been even greater, to slightly more than one-fourth. On the other hand, requirements for locomotive building are heavier with two shops taken off tanks and again building locomotives for the services. Deliveries on flanged and dished work are improving, for while shops engaged in semi-fabricating are active, the pressure is off some.

Flame-cutting absorbs a substantial



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GEARS AND SPEED REDUCERS

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tonnage of heavy plate; there has been much expansion in this branch growing out of war demand. Warehouses are moving plates in good volume for ship repairs and fill-in needs, but are hampered by lack of rounded stocks of standard sizes. They are forced to shear a larger number than usual. Third quarter orders are appearing in heavier volume and some shipyards have covered through the remainder of the year.

Wire . . .

Wire Prices, Page 155

There has been a slight increase in production of various types of fencing but total output is still far below the accumulated demand and will probably remain so to the end of the year. Situation is spotty in other merchant wire products, particularly nails, where some districts report fair supplies and others virtually nothing. Jobbers' stocks of all merchant wire items are low, generally speaking, and for the most part are not satisfying demand. Shipments of manufacturers' wire remain unchanged, with available orders running ahead of the steel directives for wire products with some non-integrated wire mills hopeful that their supply of wire rods will be increased somewhat in the directives issued this month for July production.

Rails, Cars . . .

Track Material Prices, Page 155

While an increase in domestic freight car inquiry may develop fairly soon, car deliveries this year apparently will fall substantially short of predictions of even a month or so ago. The 20,000 freight cars originally contemplated for construction and delivery to domestic carriers in the first half are far behind schedule, due to inability of carbuilders to obtain materials, and there now appears little likelihood of steel and other materials being granted by Washington before the fourth quarter for construction of additional domestic freight cars, none of which in all probability will be delivered before the beginning of next year.

Of the current program of 20,000 freight cars, only about 1500 have been turned over to the railroads to date. An effort is to be made, however, to deliver the remaining 18,500 before third quarter is ended.

Shortage of materials for car construction has not only delayed the present program, but has apparently caused the rejection by the War Production Board of the appeal of the domestic lines for 40,000 to 44,000 freight cars this year, in addition to the quota of 20,000. Not only is there a shortage of steel, it is pointed out, and particularly steel castings, but a scarcity of lumber. Steel allowances for third quarter for new car construction are practically nil, car authorities claim.

Of the various railroad demands, freight cars stand fourth on the list, in the opinion of WPB officials, MRO requirements; then rails; next motive power; and finally freight cars, with every effort being made to limit the needs of all four groups as much as possible. For instance, rail requirements have been slashed considerably since the first of the year, when 2,000,000 tons were considered probable. Now the figure has been reduced to about 1,200,000, it is claimed, with even this figure subject to some further reduction.

While it appears that car builders, once they complete the domestic freight car program of 20,000, will not have an opportunity, due to limitations on materials, to do further domestic work before the latter part of the year, it is believed likely that some fairly sizable inquiry may develop within the next few weeks at the outside, so as to get a program set up on the chance that some steel and other materials will be available later in the year.

Meanwhile, were it not for substantial army orders on hand and still others in sight, the car shops would be in for a dull period over the next few months. Even as it is there will be considerable idle capacity, car builders fear.

Latest locomotive awards include two Mallet type engines for the Bingham & Garfield, placed with the Baldwin Locomotive Works.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 155

The increase in reinforcing bar shipments during April, which resulted, in a slight increase in the May directive, did not continue and total shipments during May dropped below April. June shipments will probably run less than May, although the June directive is up slightly and orders on books are now somewhat

STRONG-CLEAN

CASTINGS SAVE MONEY

Strong takes the same well earned pride in its cleaning operations that it has for its annealing facilities. In addition to the cutting, grinding and chipping processes, Strong operates two sandblasts with the larger one capable of handling any casting which comes from its 15 by 19 annealing furnace.

All of which adds up to a standard of castings which are much easier to machine—because the steel making, the molding, the annealing and the cleaning are all handled by Strong quality controls that safeguard the buyer's interest at all stages of the work. The surest way to have stronger castings is to have them Strong-cast!

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STRONG

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heavier than the directive tonnage available.

New sales are slow with little activity in sight, and since the July directive is about to be issued, it is probable the tonnage allotted will be less than June in view of the declining orders. There is some interest on the part of certain governmental agencies for additional tonnages to be shipped before June 30 to take up parts of appropriations which have not yet been spent and which expire on that date.

Pig Iron . . .

Pig Iron Prices, Page 156

With steel works operations in New England at about 95 per cent of capacity, occasionally hitting 100, demand for basic varies little each month. Inventories for open hearths are much lower than in normal times, kept down by allocations and in the case of one producer pig iron costs are heavier under the current system of control. That the pig iron situation is somewhat easier is indicated by a slightly more liberal attitude on allocations. Inventories are maintained and shops with higher rated war orders have substantial reserves; in scattered instances more iron is allotted than requested where reserves appear too low.

The lower melt by some gray iron foundries, notably in the jobbing field, has cooled demand for iron and current inventories are maintained and even slightly expanded by less tonnage each month than was the case earlier in the year. Malleable requirements are steady with foundries in this group generally holding production schedules. Procurement offices for the various government shops continue from time to time to take open bids on small tonnages, but final disposition as to suppliers is subject to WPB allocation.

Applications for July pig iron allotments show little change in number or tonnage involved. Greatest variation is in foundry grades but in most cases smaller requirements for this iron is balanced by greater need for basic. Part of the lessened demand for foundry iron may be seasonal and partly the result of changes in war demand.

Scrap . . .

Scrap Prices, Page 158

Subsidence of floods in the middle West has removed obstacles to collection and shipment. Heavier demand for scrap has developed to offset the drop in hot metal supplies following the banking of blast furnaces, due to coke shortage in some districts.

In the Chicago area flow of scrap has been resumed, sufficient to meet current demand and provide some for reserves. Industrial scrap is steady though some loss has followed changes in war demands cutting into production of some forms of war fabricating.

Reduction in volume of hot metal following suspension of coal mining was felt severely in the Pittsburgh district where numerous stacks were banked. Scrap receipts are about normal but heavier use for steelmaking is cutting into reserves. Some furnaces will remain down for relining, putting a continuing burden on scrap supply in the interval.

Cincinnati scrap dealers fear the present quiet situation may be followed by demand late in the summer, without adequate supply. A recent domestic drive in a city in that area resulted in only 80 tons of doubtful material being collected. The heavy drive a year ago had depleted supply from this source.

Demand for top grades of open-hearth and electric furnace scrap keeps pace with supply but lighter grades lag. Plant scrap is being produced on good volume. Demand for foundry grades continues dull. Recent revisions covering scrap sales automatically lift the shipping point price at some northern New England points to $14. On hauls taking high freight charges to outside districts shipping point prices have been as low as $13, ranging upward to $14.06, depending on freight cost.

Recession of flood waters has released much scrap in the St. Louis district and shipments are satisfactory. Current arrivals are mainly allocations of remote scrap, most of which is desirable material. The Missouri drive for scrap for donation to the Army is progressing, soldiers manning 45 trucks for collection. One firm has bought 15,000 tons for delivery at St. Louis, proceeds to go to soldier benefits. Quality is high, mainly agricultural and project wreckage material.

At $17.67 a gross ton, Luria Bros., Philadelphia, has been sold 90 gross tons of welding rod butts, sale of miscellaneous supplies B-808, navy yard Philadelphia. To Michael Flynn, Brooklyn, went 1,000,000 pounds of scrap oleo-

BRASS and BRONZE CASTINGS up to 5400 pounds

Modern melting, moulding, core room, sand handling and sand control equipment, enable a trained personnel to produce the finest quality castings. Copper Base Alloys, Aluminum Bronze, Manganese Bronze and PMG metal (copper, silicon, iron alloy) produced to all Federal, Navy, Ordnance and individual specifications. Strict adherence to chemical and physical specifications.

● Two Aluminum Bronze half Spindle Slippers for a 46 inch Blooming Mill. Weight of rough castings 245 lbs. each. Hammond Alloy No. A-24.

● Screw-down nut for 94 inch Blooming mill. Specifications: Hammond M-20 Manganese Bronze. Net weight, 4200 lbs.

WRITE FOR NEW BOOK—"Practical Data on Brass and Bronze Castings". Contains complete nomenclature of copper alloys—brass and bronze. Federal, U. S. Navy, and SAE specifications. A.S.T.M. Standard definitions and terms relating to testing methods.

HAMMOND BRASS WORKS
Hammond, Indiana

tric cable at 3.87c a pound; Camden Compressed Scrap Steel Co., Philadelphia, bought 125 gross tons of miscellaneous sheet iron at $12.20 a ton and 70 gross tons of light galvanized steel scrap at $10.91.

Battlefield scrap from North Africa is beginning to trickle into this country, cargoes having arrived recently at two ports, forerunners of larger supply as gathering facilities are improved.

Semifinished Steel . . .

Semifinished Prices, Page 154

Billets and other semifinished steel are moving abroad more freely under lend-lease and third quarter shipments are expected to be heaviest in more than a year. The situation contrasts sharply with last fall, when some export accumulations along the Atlantic seaboard were offered for resale on this side. During the latter part of last year and early this year movement of semifinished abroad was practically nothing.

In late February tonnage started moving again and since then there has been a moderate increase in volume. Contributing to the better movement at this time is an easier shipping situation. Not only are more vessels clearing American ports but more are getting to destination safely. The latter situation is reflected in the lowering of Transatlantic insurance rates by Lloyds about a week ago, the first in many months.

As a result of this improved shipping situation steel stocks along the eastern seaboard for shipment abroad under lend-lease are perhaps the lowest since this country entered the war. South American countries are benefiting as well as allies in the combat zones.

Three Warehouses May Stock Aircraft Hardware

Ducommun Metal & Supply Co., Los Angeles; Supply Division Inc., Robertson, Mo.; and Aircraft Hardware Mfg. Co., New York, have been authorized by the War Production Board to stock and deliver aircraft hardware, valves and fittings. These initial authorizations were provided in directive No. 1 to L-296.

Each of these warehouses, in addition to its regular stocks, may now carry and deliver all items on Schedule A of the order, in quantities authorized by the Aircraft Scheduling unit at Wright field, Dayton, O.

Limitations on deliveries by warehouses confine deliveries to: (1) manufacturers for domestic use in construction, maintenance or repair of aircraft and air-borne accessories, parts and subassemblies; (2) maintenance and repair of planes used by air lines holding certificates of neoessity issued by Civil Aeronautical Administration; by the CAA Training Service and by Civil Air Patrol in class A category; (3) maintenance of other aircraft, when authorized by WPB's Aircraft Priorities Branch; (4) Aircraft Modification Centers and Army and Navy Supply Depots; (5) other warehouses designated by WPB to carry the same type of hardware and components.

Quantities of any specific item which may be delivered to any one customer in any month are limited.

Midwestern Warehouses Granted Price Rise on Galvanized Seconds

PRICES of secondary and rejected classifications of galvanized sheets from warehouses in five mid-western cities have been advanced by Office of Price Administration, effective June 21.

Increases were necessitated by allocation of galvanized sheet production to non-integrated mills in the eastern and southern states. As a result of this allocation, integrated mills with a Chicago basing point, no longer are manufacturing galvanized sheets but are using their producing facilities to turn out other types of steels for war industries and warehouses in the midwestern area must pay higher transportation costs for longer-haul shipments from producing mills.

The price increases in the reject classifications are as follows on a net ton basis: Chicago, $6.60; Milwaukee, $5; St. Paul, $4.60; Detroit, $2.60; St. Louis, $1.40. Increases for wasters, waste wasters, offal, side and end shearings, and galvanized sheets sheared to specifications, have been adjusted upward accordingly.

The new prices are established in

Thru World Wars I and II

A.C.P. PROCESSES HAVE DONE THEIR BIT

In giving more and better HELL to the enemy

ACP Chemicals and Processes, plus the facilities of a well-equipped laboratory staffed with technological experts skilled in the mass production and processing of all kinds of metal, are at your service to help you turn out more and better war equipment —ships, tanks, guns, bombs, shells and other accessories.

Wherever metal has been fabricated all over the world, ACP has pioneered in the supplying of chemicals and processes to facilitate production and perfect the surfaces of metal for final finish.

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RODINE—an acid inhibitor, **DEXODINE**—an acid cleaner, **CUPRODINE**—for copper coating to facilitate drawing, **KEMICK**—for painting exhaust manifolds. These are but a few of the chemicals that have been factors in speeding the production of better products. Consult with us on your metal treating problems.

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DETROIT, MICH., 6335 Palmer Ave., E. CANADIAN BRANCH WALKERVILLE . . . ONT.

amendment No. 13 to price schedule No. 49. Provision is also made for adjusting transportation charges when iron and steel products are delivered by truck outside the warehouseman's normal marketing area. The seller now may charge the truck transportation costs actually paid for, minus a deduction at the rate of 25 cents per 100 pounds.

To determine a quantity charge or deduction on a shipment of secondary iron and steel products, the seller may combine the weight of material on all orders of one day from one person for shipment to one destination, regardless of how shipments may be split by the seller for his own convenience or at the buyer's request.

Tin Plate . . .

Tin Plate Prices, Page 155

Tin plate producers are in receipt of sharply increasing amount of inquiry, which assures their operating in third quarter at as high a rate as their mill quotas will permit. It is estimated that these quotas during third quarter will average about 65 per cent. While some tin plate is going into ammunition cases and certain other types of ordnance, most is going into the manufacture of sanitary cans. One large producer estimates that 97 per cent or more of his tonnage in third quarter will go into these cans.

At least one prediction of tin plate producers made last year is now coming true. Because tin plate operations were reduced so sharply at the close of last year and during the early part of this year, many employes in tin plate departments left to take jobs where they would be assured of more continuous employment. Now with production schedules expanded, tin mills are having considerable difficulty obtaining sufficient labor. Some tin mills expect to have difficulty maintaining operations at the estimated 70 per cent level, which will probably hold for the remainder of the producing season. Production of cold-rolled strip for tinning is now at about 70 per cent of capacity, and although actual tin mill operations have not reached that level yet, they soon will.

Nonferrous Metals . . .

Nonferrous Prices, Page 159

New York—Reserve stocks of most nonferrous metals appear easier as indicated by the lifting of a few restrictions on uses. Zinc and lead conservation orders have been amended, the zinc being freer for the galvanizing of pails. Allocations of zinc for galvanizing, however, are geared to steel tonnages available for coating.

Brass mills generally are well stocked with scrap, affecting copper allocations to an increasing extent. While certain grades of scrap are tight, plans for a nation-wide drive for scrap copper and brass are meeting with some opposition by those who believe no large amount of scarce grades would be uncovered. Those favoring a scrap drive, mostly in the copper division, WPB, claim results would take up the slack at refineries. The tonnage of fired brass cartridge cases held by Army ordnance is increasing.

Producers' zinc stocks are increasing gradually and inventory carried by MRC has been extended, but easing on general restrictions has been slight. Producers could fill heavier allocations were they certified. However, WPB has ruled that only MRC buys for public account and is the only buyer of zinc permitted to acquire the metal without allocation. Because of the lower demand for paint pigments, leaded zinc oxide operations are but 50 per cent of capacity at some units.

Close control of tin distribution continues with a minimum of cross-hauling. Electrolytic units are getting into production on a heavier scale and tin going to tin plate mills was about equally distributed over the three months of the second quarter. To provide for sales of grades produced at the Texas smelter which fall below Grade A, an amendment to the price schedule is thought likely. Now selling on the basis of 99 per cent tin, the Texas material contains nearer 99.5 per cent. Grade A price of 52.00c will not be changed. An estimated 3000 tons of tin will be saved in 1943, and 5000 in 1944 by a single use of silver-lead instead of tin-lead solder. This tin saving will result from the use of silver-lead solder in 40 per cent of the 1943 output and 70 per cent of the 1944 output of cans for foods, household products, chemicals and other purposes. The silver-lead solder contains about 2.5 per cent silver, 5 per cent tin and 93.5 lead, while the tin-lead solder contains 30 to 40 per cent tin and 60 to 70 per cent lead. And since lead has almost ceased to be a critical material—all restrictions

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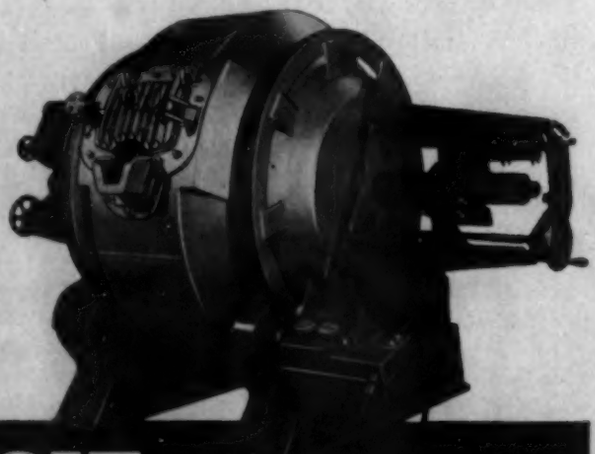

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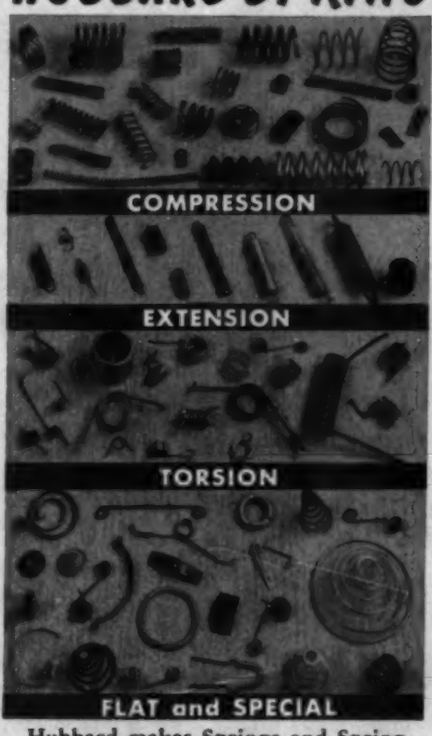

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MOTORIZED PLANETARY REDUCER
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having recently been removed from its use for essentiaal purposes—the increased consumption of that metal is no problem.

New regulations primarily aimed at more rapid turnover in warehouse products is tentatively included in a proposed revision of CMP regulation No. 40. No distributor would be permitted to deliver any aluminum except to fill an authorized controlled material order. After July 1 no warehouse could make delivery of any brass mill or wire mill products except to fill an authorized controlled material order. While the prohibition against ordering or accepting deliveries from warehouse stocks of brass mill products during any one month in excess of 2000 pounds gross weight remains unchanged, the proposed amendments raise this limitation in the case of wire mill products to 3000 pounds copper content.

Pacific Coast . . .

Seattle—Industrial plants in this area are operating at top speed, more than 90 per cent on contracts related to the war effort. Ship construction is in full swing while subsidiary plants and machine shops have capacity bookings of ship equipment. Willamette Iron & Steel Corp., Portland, Oreg., has been awarded an additional $6,000,000 contract for the manufacture of 64 engine sets for Liberty ships. This firm has already delivered 109 engines to yards on this coast.

Pacific Car & Foundry Co., Seattle, is nearing completion of a contract to build 170-ton steel barges, of 250 tons capacity for the Navy. These units required approximately 100 tons of shapes and plates each. Some of them were built at the Renton plant and then hauled to water by house-moving equipment.

Structural fabricators are seeking new business as present demand fails to keep their facilities fully employed. No major private jobs are pending although much government work is still on the books. Worden-Allen Co., Milwaukee, low at $25,035, has the contract to furnish structural steel for the spillways at Alder and LaGrande dams, Tacoma's second Nisqually power project. About 150 tons of shapes are involved. Supply by special engineers discloses that the cost of this installation will exceed $17,000,000. Original estimates were $11,000,000.

The first unit of the government-owned magnesium plant at Spokane, Wash., went into operation May 25. It was built by the Electro Metallurgical Co., subsidiary of Union Carbide & Carbon Co., for the Defense Plant Corp. Full operation is planned by the end of the year. Iron ore from a newly developed property at Pateras, Wash., is being shipped out a carload daily. Citizens of The Dalles, Oreg., are urging a local site for a proposed aluminum extrusion plant and plans will be submitted to WPB.

Seattle's city light department plans construction of a substation in the Magnolia district, Hendrikson Construction Co., Seattle offering the low bid, $26,500.

United States engineers, Seattle, have awarded more than 30 contracts recently, including one to Clifton & Applegate and Henry Georg, Spokane, for construction of railroad tracks. Sound construction & Engineering Co., Seattle, has a military installation job in Western Washington in excess of $100,000. One contract is over $1,000,000 and four over $100,000 for military projects in this state and Montana. Large housing projects have been placed lately, one at Bremerton, Wash., involving 1000 units, contract pending.

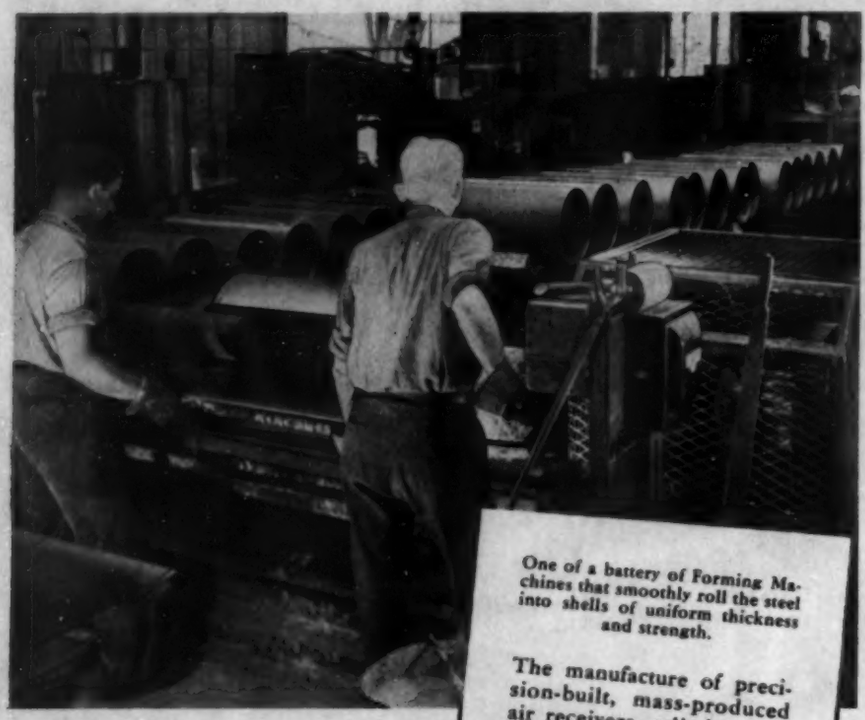
Steel in Europe . . .

London — (*By Radio*) — Armament needs of Great Britain are being met and heavy bookings have been made for third quarter delivery, especially for shipbuilding materials. Demand for finished iron and steel products is much improved. Tin plate demand is quiet.

Canada . . .

Toronto, Ont. — A number of adjustments are being made in specifications for steel as a result of change in the Canadian war production program. Specification revisions are chiefly associated with alloy steels and some other lines for entirely new production. While there has been some slowing in new steel buying, there has been a sharp upturn in tonnages involved in individual orders with the result that mill backlogs are gaining in volume. Despite announcements from the head of the Department of Munitions and Supply, that larger quantities of steel may become available to civilian users, nothing definite in this respect has yet developed, and practically all new steel orders are directly associated with the war program.

While there has been some easing in



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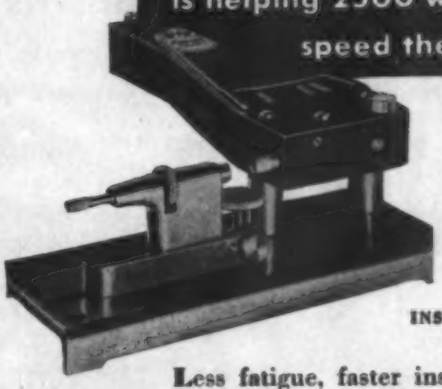

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Write for illustrated booklet showing many applications of Micro-Chek.

TRICO

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plate orders demand is sustained and backlogs extend to the end of the year. Shipbuilding is absorbing most domestic plate production, as well as imported plate. However, deliveries to rolling stock builders continue to expand and efforts are being made to speed production of urgently needed freight cars for Canadian use and engines for India. Marine boilermakers are swinging into maximum production and are seeking larger quantities of plates.

Demand for merchant bars is absorbing all available supply, and while backlogs extend well into fourth quarter mills continue to take on additional business. So far there has been no easing in civilian supply and most deliveries on this account are if and when surplus stocks are available. Demand for alloy bars is gaining in volume with most new bookings running to new specifications. Producers of alloy bars report output close to capacity.

Dealers report scrap iron and steel receipts steady, with sufficient tonnage appearing to enable scheduled deliveries to consumers. While some dealers are piling scrap for future sorting and have accumulated fair tonnages, others have only small quantities on hand and their yards are being kept fairly clean. Automobile wreckers are taking more care in wrecking operations and are salvaging parts for resale that formerly were consigned to the scrap heap.

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Predicts Postwar Boom In Textile Machinery

The war-time strain on textile mill equipment has been so great that prompt widespread replacement will be one of the first necessary readjustments confronting that industry with the return of peace. Machinery manufacturers will be deluged with the greatest volume of orders they have ever known, according to C. T. Murchison, president, The Cotton-Textile Institute. It is highly desirable that each mill operator plan probable machinery needs as far in advance as possible and have orders ready for placement just as soon as they can be given consideration by the machinery builders, he advises.

Textile mill machinery will be badly worn and battered, looms designed for light fabrics over-strained on heavier work. Most equipment will have operated throughout the duration 24 hours a day, six days a week, and much of it will have been operated seven days a week. Repair and maintenance will have been accomplished with great difficulty because of continuity of operation and the extreme scarcity of repair parts. To establish itself on a thoroughly efficient basis the greater part of the industry will need entirely new equipment, in Mr. Murchison's opinion.

The large textile equipment industry in New England has been partially engaged on war production, largely outside its regular field, due to restrictions on new textile machinery. Only recently were restrictions on repair and maintenance parts lifted slightly. While machining and metalworking departments have been active on war work, other departments have been down and pig iron melt for castings has been well below normal.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

National Screw & Mfg. Co., Cleveland, machinery and equipment for a plant in Ohio, costing $175,000.

General Electric Co., Schenectady, N. Y., equipment for a plant in Pennsylvania, costing $825,000.

Fulton Iron Works, St. Louis, plant equipment in Missouri, costing $100,000.

Goodyear Aircraft Corp., Akron, O., increase in contract to provide additional facilities at plant at Arizona, costing $450,000. Overall commitment now $6,400,000.

Air Products Inc., Detroit, plant facilities in Michigan, to cost $225,000.

Iron Fireman Mfg. Co., Cleveland, additional equipment for plant in Ohio, costing $100,000.

Jensen Machinery Co. Inc., Bloomfield, N. J., increase in contract to provide additional equipment for plant in New Jersey, resulting in overall commitment of $165,000.

Crown Can Co., Philadelphia, for additional facilities at plant in Pennsylvania, to cost $130,000, making overall commitment $4,000,000.

Studebaker Corp., South Bend, Ind., additional facilities at plants in Illinois and Indiana, to cost $3,600,000, making overall commitment $87,000,000.

Plantation Co. Inc., Vienna, Ga., for plant facilities in Georgia, $120,000.

B. F. Goodrich Co., Akron, O., for machinery and equipment at a plant in Ohio, to cost $900,000.

General Motors Corp., Detroit, for facilities

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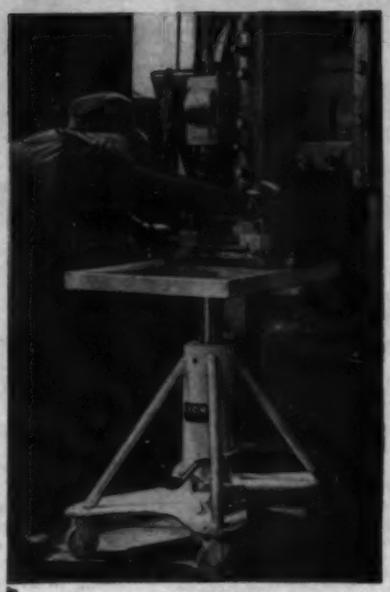

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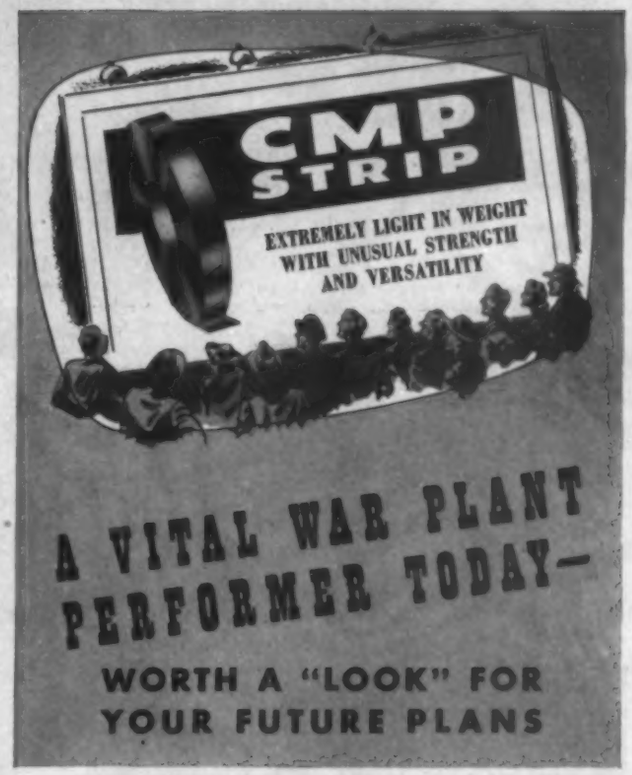
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And CMP did not fail when called upon in many cases to extend its service and replace other "gone-to-war" performers, such as critical light gauge non-ferrous metals; again CMP proved its wide adaptability by meeting the important physical characteristic requirements so that the Victory "production show" could go on.

Wouldn't it be wise to investigate right now how this "know how" specialist in precision light gauge strip steel could help you get "top" box office for your post-war products? CMP offers their cooperation.

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COLD METAL PRODUCTS CO.

Subsidiary of the Cold Metal Process Co.

YOUNGSTOWN, OHIO

at plants in Ohio at cost of $11,300,000, making total commitments now $24,500,000.

Columbia Steel Castings Co., Portland, Oreg., for facilities for a plant in Oregon, to cost $185,000, total commitments now $1,000,000.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

1000 tons, modification center, Staniford field, for U. S. Engineer, Louisville, Ky., to Mississippi Valley Structural Steel Co., Decatur, Ill.

350 tons, leanto, airplane repair building, Oklahoma City air depot, Oklahoma City, Okla., to Muskogee Iron Works, Muskogee, Okla.

343 tons, radial gates, La Grande, Wash., for City of Tacoma, to Worden-Allen Co., Milwaukee.

SHAPE CONTRACTS PENDING

1700 tons, testing laboratory, Wright Field, Dayton, O.; bids June 24.

100 tons, miscellaneous steel structures, switchyard, Shasta Power plant, Bureau of Reclamation; Bethlehem Steel Co., San Francisco, low.

REINFORCING BARS . . .

REINFORCING STEEL PLACED

390 tons, modification center, airplane plant, Ft. Crook, Neb., to Ceco Steel Products Corp., Omaha, and Concrete Products Co., Omaha; Peter Kiewit Sons Co., Omaha, contractor.

175 tons, Pennsylvania state bridge, Delaware county, to Taylor-Davis Inc., Philadelphia.

160 tons, box culvert, CAA, Robertson, Mo., to Laclede Steel Co., St. Louis.

100 tons, air base, Rapid City, S. D., to Ceco Steel Products Corp., Omaha, Neb.

REINFORCING STEEL PENDING

100 tons, building, A. E. Staley Mfg. Co., Decatur, Ill.; J. L. Simmons Co., Indianapolis, contractor; bids asked.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Bingham & Garfield, two Mallet-type locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Industrial Aircraft Mfg. Co., has been incorporated by Herman M. Greene, George Schinolt and Harry F. Clarke to manufacture tools and equipment for the aircraft industry. Paul H. Dilworth, 20 Hulbert avenue, is statutory agent.

ALLIANCE, O.—Alliance Radio Corp., recently incorporated, is preparing to manufacture radios, generators and electronic devices and will employ 600 to 700 persons when production reaches its peak, in about eight months.

BEREA, O.—Finkbeiner, Pettis & Strout, 725 Nicholas building, Toledo, O., are consulting engineers on municipal water purification plant repairs and alterations, involving underpinning, tanks and additional inside piping, to cost about $10,000, on which bids will be opened June 14. L. D. Repperd, Portage, O., has plans.

CLEVELAND—Champion Machine & Forging Co., H. W. Foster, president, 3695 East Seventy-eighth street, will erect a die storage and service building at Aetna road and East Seventy-eighth street, two stories, 80 x 200 feet.

CLEVELAND—Dust Control Co., Charles Weger, 1823 Alvin avenue, agent and incorporator, has been organized to manufacture dust control equipment and is negotiating for a suitable plant.

CLEVELAND—Newburgh Machine Engineering Co. has been incorporated by Lawrence A. Suhadolnik, 3733 Sudbury road, and associates, to operate a machine shop.

CLEVELAND—American Magnesium Corp., Leslie W. Rogers, secretary-treasurer, and H. Nurnberger, plant engineer, 1099 Ivanhoe road, will build new one-story boiler plant 45 x 100 feet. Firm is subsidiary of the Aluminum Co. of America, Gulf building, Pittsburgh.

CLEVELAND—Monda Kelly Machine Products Co. has been incorporated by W. M. Van Aken, 1715 Euclid avenue, to engage in business of machining bearings at First and Hayden avenues, East Cleveland. S. M. Monda is president, C. E. Kelly, vice president.

CLEVELAND—Cleveland Rock Drill Co. Inc. has been incorporated as a subsidiary of the Cleveland Pneumatic Tool Co. by Peter Reed, Charles Follett and Sheldon S. Reynolds. McKeehan, Merrick, Arter & Stewart, Terminal Tower, are legal representatives.

CLEVELAND—Linderme Tube Co, Emil M. Linderme, vice president and treasurer, will build a one-story degreasing building 42 x 60 feet, at 1300 East 219th street, Euclid, to cost about $5000.

ELYRIA, O.,—Henry Furnace Co. is being incorporated as subsidiary of C. A. Olsen Mfg. Co. and includes in its assets the real estate and equipment of the Henry Furnace & Foundry Co., Cleveland, which has been

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BARS

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Spec. AN-QQ-S-684

SAE 4340X C.F. AND H.R.
Spec. AN-QQ-S-756 NEW!

12 CHROME STAINLESS C.F.
Spec. AN-QQ-S-763

SAE 4140 HOT ROLLED
Spec. AN-QQ-S-752

NE 8740 C.F. AND H.R.
Spec. AN-S-16

NE 8630 COLD FINISHED
Spec. AN-S-14

18-8 STAINLESS COLD FINISHED
Spec. AN-QQ-S-771
Spec. AN-QQ-S-763

SHEETS

18-8 STAINLESS COLD ROLLED
Spec. AN-QQ-S-772

TUBING

Seamless Cold Drawn
SAE 4130X
Spec. AN-WW-T-850

Welded Cold Drawn
SAE 4130X
Spec. AN-T-3

BILLETS

SAE 4130X H.F.
Spec. AN-QQ-S-684

NE 8630 H.F.
Spec. AN-S-14

SAE 4340X H.F.
Spec. AN-QQ-S-756

NE 8740 H.F.
Spec. AN-S-16 NEW!

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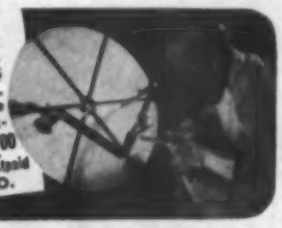

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bought by C. A. Olsen, president of the firm. Cleveland assets, consisting of an office and warehouse, are held by Leonard G. Roof, Cleveland, and associates.

WARREN, O.—Packard Electric division of General Motors Corp., B. N. McGregor, plant manager, 3-523 Dana street, is spending $65,000 on plant additions, including a loading and storage dock and a two-story building 84 x 101 feet, construction to start at once.

WARREN, O.—Brainard Steel Co., Larchmont avenue NE, is spending about $100,000 for equipment and remodeling the former creamery plant at East Orwell for a steel fabricating plant. Tubing for the Army will be manufactured, with 24 to 30 workers employed.

CONNECTICUT

BRIDGEPORT, CONN.—Sikorsky division of United Aircraft Corp. has bought a plant here from Crane Co. and will use it for manufacture of helicopters. An adjoining tract has been acquired for an airfield.

NEW YORK

BAYSIDE, N. Y.—Sylvania Electric Products Inc., 500 Fifth avenue, New York, plans postwar erection of a research, development and administration center comprising nine buildings, at cost of about $2,000,000. Austin Co., 19 Rector street, New York, is engineer.

MICHIGAN

DETROIT—Willey's Carbide Tool Co. is taking bids through Charles N. Agree, 1140 Book Tower, for an addition to its plant at 1340 West Vernor highway.

DETROIT—Bryant & Detwiler Co., 2304 Penobscot building, has been awarded general contract for aircraft engine test building, extension 3, for Ford Motor Co., to be located at the Rouge plant, Dearborn, Mich.

MISSISSIPPI

JACKSON, MISS.—United States engineer, Mobile, Ala., has let contract to Capitol Building Co., Jackson, at $90,000, for additional facilities for second air force, additional facilities for anti-submarine command, flight surgeon's building and motor repair shop in Harrison county, Mississippi. Invitation No. 569-43-729.

SOUTH CAROLINA

HOLLY HILL, S. C.—Volunteer Portland Cement Co., Knoxville, Tenn., and American Naphthaline Co., J. Ross Hannahan, president, New York, are forming a joint operating company to develop and operate a $2,650,000 alumina plant near Holly Hill. RFC has authorized funds for construction. Plants will be built about 2½ miles from Harleyville. Capacity will be about 40 tons of alumina daily.

WISCONSIN

BUTLER, WIS.—A. O. Smith Corp., Milwaukee, will let contracts for a propeller blade factory, including main building 340 x 440 feet, boilerhouse 50 x 120 feet and garage 60 x 120 feet. E. W. Burgess, company engineer, is drawing plans.

MINNESOTA

MINNEAPOLIS—Pal Tool Co., J. E. Anderson, proprietor, manufacturer of dies and metal stampings, is adding a second story addition to its plant.

MINNEAPOLIS—Majestic Drill Sharpener Co., 1224 Harmon place, has been incorporated to manufacture drill sharpening machinery by James R. McKenzie, F. F. McKenzie and Arthur J. Severtson.

MINNEAPOLIS—Strong-Scott Mfg. Co., manufacturer of flour mill and grain elevator machinery, has given contract to C. F. Haglin & Sons Inc., 720 National building, for one-story plant addition 30 x 80 feet. Larson & McLaren, Foshay Tower, are architects.

MINNEAPOLIS—General Mills Inc. has bought large two-story building adjoining its naval ordnance plant on Central avenue Northeast to provide additional facilities. The ordnance plant is operated as the mechanical manufacturing division.

MINNEAPOLIS—Franklin Transformer Mfg. Co., 607 Twenty-second avenue Northeast, has bought building at 65 Twenty-second avenue, to be converted into a factory, giving firm three plants and doubling capacity. Company manufactures battery charging and testing equipment, industrial transformers, welding equipment, electric motors, electronic devices and radio equipment.

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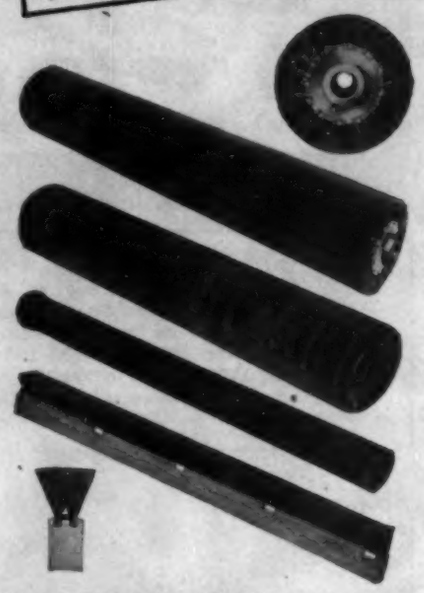

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Co., 2 South Barstow street, Eau Claire, Wis., is having plans prepared for a postwar electric power plant, to cost about $1,500,000.

STILLWATER, MINN.—Standard Salt & Cement Co. and Gilbert Mfg. Co. will remodel old Gilbert plant into war production plant for forgings production. C. E. Gilbert will be plant manager. Railway spur will be built into plant.

ST. PAUL—St. Paul Welding & Mfg. Co., manufacturer of welding torches and other welding equipment, has let contract to Lauer Construction Co., 230 Western avenue South, for a one-story factory addition.

TEXAS

CONROE, TEX.—Columbian Carbon Co., Houston and Rosslyn roads, Houston, Tex., plans a carbon black plant for synthetic rubber program. Total estimated cost $3,000,000; present appropriation $1,225,000. M. R. Howell, general delivery, Conroe, is engineer.

UTAH

MARYSVILLE, UTAH—An RFC loan of $775,000 to Aluminum Inc., George A. Critchlow, manager, has been made for construction of a plant at Marysville, to produce alumina. Of the loan $450,000 is for buildings and equipment.

CALIFORNIA

ALHAMBRA, CALIF.—Dingee Aircraft Production has been formed by William W. Dingee Jr. and will establish a plant at 3060 West Main street.

BURBANK, CALIF.—Adel Precision Products Corp., 10777 Vanowen street, North Hollywood, will build plant No. 2 near the present plant and will make additions and alterations to buildings recently purchased for plant No. 3 in Burbank, total cost to be $500,000, including equipment.

EUREKA, CALIF.—Eureka Shipbuilders Inc. has been organized with $500,000 capital by L. Mone Call, 1506 Sixth street, and associates. Representative is Walter Sorensen, 501 Helm building, Fresno, Calif.

HUNTINGTON PARK, CALIF.—Pacific Pump Works, 5720 Bickett street, has let contract for a plant addition 70 x 172 feet, to cost about $30,000.

HUNTINGTON PARK, CALIF.—Baker Oil Tool Co., 6000 South Boyle avenue, will build a plant addition at 2939 Slauson avenue, 58 x 60 feet, to cost about $3000.

LONG BEACH, CALIF.—Crescent Tool Co., 3369 Cherry avenue, has been formed by Paul John Powers, Edwin Bruns and Clarence H. Mangels.

LOS ANGELES—Junior Steel Co., 1960 South Alameda street, will build a warehouse addition 40 x 60 feet, to cost about $3400.

LOS ANGELES—California Steel Treating Co. will build a factory building at 2840 East Washington boulevard, 45 x 75 feet, costing $1500.

LOS ANGELES—American Screw Products Co. is building a machine shop at 7000 Avalon boulevard, 26 x 40 feet, to cost about $1900.

LOS ANGELES—Western Nipple Mfg. Co. is the firm name under which Republic Supply Co., W. L. Duhlig, president, and F. E. Wilkinson, secretary, has published intention to conduct business at 5816 South Boyle avenue.

LOS ANGELES—General Metals Co., 5701 South Boyle avenue, has let contract for an addition to cost about $25,000 for steel frame and corrugated steel plant.

LOS ANGELES—Newport Aero Marine Inc. has been organized with $100,000 capital by Hallam Mathews, 846 Maltman avenue, and associates. Representative is Gilbert Fall, 1212 Spring Arcade building, Los Angeles.

NORTH HOLLYWOOD, CALIF.—Coast Bushing Co. has been formed by H. L. Bryan to conduct business at 4806 Laurel Canyon boulevard.

VERNON, CALIF.—David C. Jones Steel Products has been formed by David C. Jones to conduct business at 4636 Pacific boulevard.

WILMINGTON, CALIF.—Texas Co. will start work at once to adapt its refinery on East Pacific Coast Highway in Los Angeles harbor to 100-octane gasoline at cost of about $50,000,000, including about 40 buildings. Foster-Wheeler Corp., 715 West Olympic boulevard, Los Angeles, has been awarded contract for the alkylation system and feed preparation.

WASHINGTON

SEATTLE—Johnson Mfg. Co., Fox and Holly streets, engaged on government contracts for marine machinery, recently suffered severe loss by fire in its plant.

SEATTLE—Smithway Machine Co. is building a plant addition at 4616-24 Seventh avenue South, 55 x 100 feet, general contract being awarded to H. E. Carlborn. William G. Brust is architect.

SEATTLE—Plant of Heffernan Engine Works, used in recent years as repair shops by the Alaska Steamship Co., has been bought by Todd Seattle Dry Docks Inc. and will be used for outfitting and repair. Plant is at 1700 Harbor avenue SW, and contains, dock, crane and shop facilities.

CANADA

SHELBURNE, N. S.—Canadian Fairbanks Morse Co. Ltd., 980 St. Antoine street, Montreal, Que., manufacturer of scales, valves and equipment, will start soon on construction of plant addition here to cost about $75,000, with equipment.

CHIPPAWA, ONT.—Norton Co. has had plans prepared for furnace room addition to cost about $12,000, with equipment. H. J. Daly is plant manger.

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, is having plans prepared by C. D. Howe Co. Ltd., Pigott building, for new plant building, two stories, 50 x 70 feet, to cost about $65,000.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, manufacturer of automobile parts and similar products, has had plans prepared for additions and alterations to plant on which contracts will be awarded soon.

ST. THOMAS, ONT.—Webster Air Equipment Co. Ltd., 1161 King street West, London, Ont., W. C. Webster, president, plans additions and alterations to building formerly occupied by Erie Iron Works, Moore street, and will remove plant from London to that location.

TORONTO, ONT.—Canadian General Electric Co. Ltd., 212 King street West, is having plans prepared by Beck & Eadie, architects, 220 Bloor street West, and bids will be asked soon for plant addition at 189 Dufferin street, to cost about $250,000, with equipment.

WINDSOR, ONT.—Chrysler Corp. of Canada Ltd., 300 Tecumseh boulevard East, will let contracts soon for plant addition to cost about $50,000.

LACHINE, QUE. — Dominion Engineering Works Ltd., First avenue, has let general contract to Hyde & Miller Ltd., 1500 Guy street, Montreal, for an addition to its coppersmith shop and storage building near the marine erection shop, to cost about $40,000, and addition and alterations to transformer house, costing about $25,000.

MONTREAL, QUE.—Montreal Tramways Co., 159 Craig street West, A. Duperron, chief engineer, plans construction of bus garage and shops on Atwater avenue, to cost about $250,000, with equipment.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, will let contracts for further additions to plant of the Turcot Propeller division, to cost about $25,000. Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, is erecting an addition costing about $75,000.

VALLEYFIELD, QUE. — Canadian Bronze Powder Works Ltd., 9 East Park, P. Schopflocher, chief engineer, is having plans prepared and will start reconstruction of burned plant buildings, to cost with equipment about $60,000.

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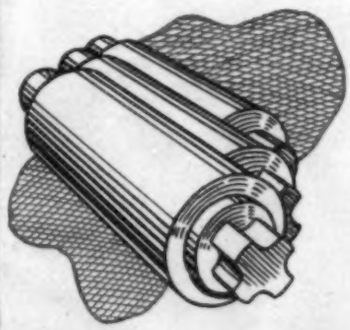

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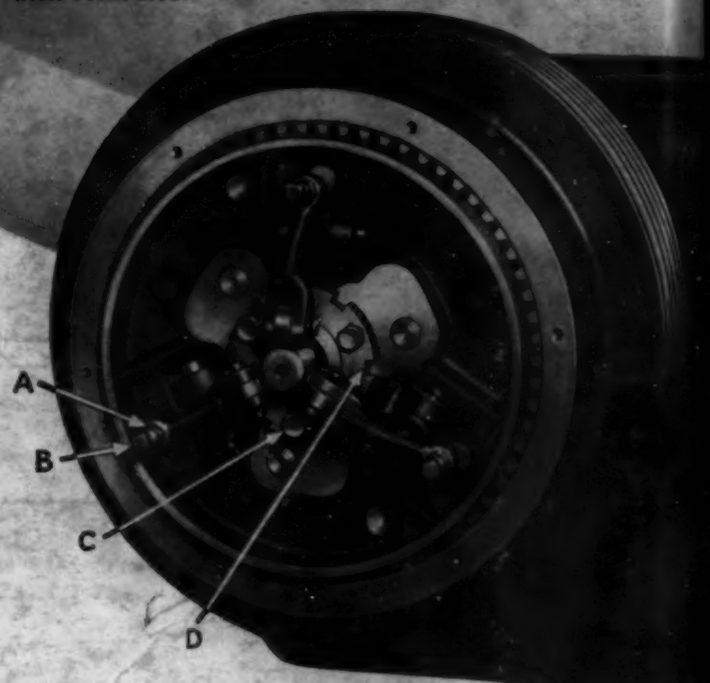
I'm Tellin' You...

No. 10 in a Series of Tips on "Keeping 'em Turning" by Tom Toker, 40 years at LeBlond

Any lathe requires adjustment from time to time. How often depends on the type of operation and sometimes on the operator. Although it is seldom needed, the clutch is one spot to watch. If I tried to explain the "whys and wherefores" of the mechanics involved in the LeBlond clutch, it would take several of these pages, which the "front office boys" assure me can't be bought with marbles. So without going into details, here are two symptoms of trouble and their remedies:



Loss of power — When the lathe slows under cut and the flow of power is irregular or jumpy, it's a pretty fair sign that the clutch is slipping.

Here's the remedy:

1. Put clutch in engaged position.
2. Drain oil through plug at bottom of clutch cover.
3. Remove the six screws to take off cover.
4. Loosen three lock nuts on clutch fingers (A).
5. Turn three screws equal degrees to the right (B).
6. Tighten three screws (B) until belt slips when spindle is blocked. With even adjustment, push rod will run dead center.
7. Tighten lock nuts (A).
8. Replace cover, refill with oil.

Hot clutch box — When there is too little clearance between the clutch plates while the lathe idles, friction overheats the non-circulating oil, breaking down its lubricating properties. When this happens, the cover plate will be hot to the touch.

Here's what to do:

1. With the oil drained, cover plate removed and clutch engaged, remove three screws (C).
2. Use a spanner wrench to tighten lug nut (D).
3. After checking manual for exact number of turns, back off lug nut. Check with feeler gauge the space specified between clutch hub and adjusting nut.
4. Replace screws (C) to draw clutch assembly tight against nut in proper operating position.
5. Replace cover plate and refill with oil.

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